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Sixty-five participants from 13 states attended this annual conference. The major papers presented included: (1) "Change Process in Education, A Theoretical Construct," by R. Meisner, (2) "Application of the Change Construct in Agricultural Education," by D. Towne, (3) "Variables Influencing Adoption of Cooperative Agricultural Occupations Curricula," by D. Williams, (4) "Agricultural Education 1980: A Look into the Future," by O. Thompson, (5) "Research Activities: Regional and National Trends and Prospects," by H. Haswell, (6) "Functions of the Educational Resources Information Center (ERIC) Clearinghouse for Rural Education," by E. Edington, (7) "Uses of the Research Coordinating Unit (RCU) 'Discretionary' Award Fund," by B. Stevenson, (8) "Activities of the RCU for Effective Implementation of Change in Agricultural Education," by R. Baker, (9) "Teacher Educators--Supervisors: Cooperation for Change," by F. Tuttle, (10) "Changing Teacher Behavior--Climate for Change," by C. Webber, (11) "Vocational Agriculture of Guthrie High School," by T. Carey, and (12) a conference summary and evaluation, by R. Price. Two task forces reported on priorities for research in agricultural education. The comments and discussion of those in attendance are included in the report. (DM)

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CHANGE IN AGRICULTURE EDUCATION ,

Proceedings of the Seventeenth Annual Southern Research Conference in Agricultural Education

July 30, 31 and August 1).

(Oklahoma State Univ~~ersity~~ .)

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CHANGE PROCESS IN EDUCATION: A THEORETICAL CONSTRUCT

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Introduction

Change appears more and more as an inevitable phenomenon of both nature and society. Because education has come to be expected as an instrument of society to bring about appropriate change, education today is being examined as never before in light of societal change.

For too long we have been "contented" to drive the same old road, each of which always leads, incidently, to the same old place. The speaker is reminded of a cartoon that appeared recently, depicting the approach to a virtually impassable backwoods road marked with a sign reading: "pick your ruts carefully, you may be in them for a long time."

Some fifty years ago, H. G. Wells concluded from his study of history that the whole world from his vantage point was engaged in a fateful race--a race between education and catastrophe. This is perhaps even more true today. It is a race that has seen industrialized nations make ever increasing commitments on the side of education. Because of these and other human resource commitments, education it seems, has greater opportunity today than ever before to respond in a more positive fashion.

Planning Education for the Future

A recently published series, Designing Education for the Future,[1] reports on a unique effort to keep education in the race. The project, headed by Edgar L. Morphet, is sponsored by the U. S. Office of Education. In the first volume, twenty-four authorities representing a variety of technical fields venture out on what they believe will be the nature of society come 1980. Three dominant aspects of our environment that were projected by Shetler[2] include: (1) world urbanization, (2) industrial automation, and (3) the information technology revolution.

Within these aspects there is continued reference to people. Increased populations are pictured as congregating in small areas. They are seen as being relieved largely of manual labor. Granted more leisure time, people will seek an interdependence with other people. The chief target for change in the future appears to be this growing complexity of improved human relations. A second target springing out of urbanization and an increasing population involves the technical ability of all people to comprehend and manage a variety of systems in daily living. A more frustrating set of targets center around technical accomplishments leading to production, distribution, and operation of an economy that minimizes the full-time employment opportunities.

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[1] See Edgar L. Morphet and Charles O. Ryan (eds.), no. 1: Prospective Changes in Society by 1980; no. 2: Implications for Education of Prospective Changes in Society; and no. 3: Planning and Effecting Needed Changes in Education.

[2] Richard L. Shetler, "Major Problems of Society in 1980," Prospective Changes in Society by 1980, in ibid., pp. 261-268.

In accessing these and related societal changes, Ralph Tyler[3] proposed four new tasks now confronting the schools, all of which have implications for occupational education and training. The four tasks, which Tyler suggests are "readily recognized," involve: (1) educating the children who have not heretofore been reached, (2) affording effective post-high school education for many youth with limited educational backgrounds, (3) providing for the re-education of adults, and (4) the attainment of certain new aims or objectives. Occupational education, Tyler argues, should be a core responsibility of the schools when viewed in this larger context, but adds, it should emphasize individual flexibility. The more salient objectives of occupational education are seen as increasing understanding of the world of work, knowledge of vocational opportunities, development of basic literacy and work habits, development of ability to plan for a career, development of the abilities required in the general field of an occupation, and the development of specific occupational skills as needed.

Occupational education within this framework, involves experiences in both the elementary and secondary schools as well as colleges and other post-high school institutions. Furthermore, opportunities should not be limited by age or previous schooling if the student can be substantially aided in his educational development by further school experiences.

The suggestions of Tyler, along with those advanced by Gordon Swanson who contributed to the same series suggest a shift in occupation from natural resource development to human resources training and retraining. An examination of national goals as set forward by the National Planning Association in 1965 substantiates the anticipated shifts and their significance to occupational educators concerned with planned changes. A look at "identified goals" and their anticipated percentage increases in expenditure between 1962 and 1975 are as follows: (See Table 1). These projections are used to emphasize how extremely useful national goals are in planning for educational change. These projections further suggest accomplishments in change involve both individual and institutional decisions as well as government decisions at every level.

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[3] Ralph W. Tyler, "Purposes, Scope and Organization of Education," Implications and Education of Prospective Changes in Society, op.cit., pp. 37-44.

For comparison, the National Planning Association has estimated the federal government's expenditures by program objective in the 1970's taking into account recent trends in government spending, population growth, rural-urban populations shifts, and the impact of recently enacted legislation such as Medicare and ESEA. (See Table 2)

Someone has stated that to be effective a plan must effect change. If one considers research, goal-setting, and plan formulation as part of the planning process, the planning program should make goal formulation the focus of decision making. The planner's greatest challenge is to formulate meaningful alternatives. The role of the plan is to state the goals, thereby providing the common guide for all parts of the anticipated program. To effect change the plan must be a strategy for development.

TABLE I

Goal Area	Percentage Increase (1962-75)
Consumer Expenditure	86
Private Plant and Equipment	210
Urban Development	102
Social Welfare	144
Health	164
Education	170
Transportation	115
National Defense	31
Housing	110
Research and Development	112
Natural Resources	183
International Aid	158
Space	188
Agriculture	28
Manpower Retraining	2750
Area Redevelopment	171

Source: Leonard A. Lecht, The Dollar Costs of Our National Goals, (Washington, D. C.: National Planning Association, 1965).

TABLE II

Estimated Federal Government Expenditures by Program Objective, 1962 and 1975*

(in millions of 1964 dollars)

	Program Area	Actual 1964	Projected 1975	Percent Increase, 1964 to 1975
1.	Education	$ 1,100	$ 5,700	418
2.	Job Preparation	700	4,700	571
3.	Health	4,400	11,600	164
4.	Social Welfare	25,200	48,200	91
5.	Natural Resources Conversation and Development	2,900	6,500	124
6.	Research and Development	13,700	17,900	31
7.	Housing, Area Redevelopment, Transportation, Communications	8,800	18,700	112
8.	Defense, AEC, Space, International	48,600	51,000	5
9.	Farm Income Stabilization	4,100	3,300	-20
10.	General Government Operations	10,800	12,700	18
	TOTAL	$120,300	$180,300	50

*Derived from National Economic Projections to 1976/77 (Center for Economic Projections, National Planning Association, 1966), p. 18. The figures listed refer to fiscal years 1964 and 1975. They represent the federal consolidated cash budget expenditures.

The Nature of Change

In attempting to arrive at a theoretical construct of the change process, one soon recognizes that the requirements for a theory of change can be specified, however, a theory itself is not in sight. If we can agree on what it must contain, then perhaps we can better see how to build it. The requirements for a theory of changing may be premised upon a role relationship between the change agent and the client system. The fact that we have no approximations of such formulations does not prevent us from specifying what might be considered appropriate theoretical constructs.

Planned change occurs when human forces are organized to regulate certain occurances during a defined period of time. Hence, the planned change process may be defined as a deliberate and collaborative process involving change agent and client system. In other words, systems are brought together to solve a problem or more generally to plan and attain an improved state of functioning in the client system by utilizing and applying valid knowledge.

Other terms used by those who study the planned change phenomenon may be equally useful:

Innovator. The person who invents the change.

Change Agent. The person who attempts to introduce the change in a particular situation. The word "advocate" also is used in this connection.

Client system or target system. The group, organization, institution individual or segment of society to which the change is to be introduced.

Adopter. One who accepts a changed way of behavior. "Adapter" would indicate a person who accepted the changed way of behaving but modified it to suit conditions and his needs.

Intervention. An act by a change agent designed to influence the client system.[4]

The Change Continuum

Ronald Lippitt has underscored the importance of differientiating between innovation and adoption change, concepts of importance to those concerned with strategies of bringing about planned change. Lippitt sees innovations and adoption representing different points on a change continuum. He points out the possibility that the process of diffusion of practices in education is different from that of other areas such as agriculture and medicine. His research seems to bear out that the two processes are carried out by different types of people or at least by teachers in different relationship patterns within the school. Lippitt concludes that "data on adoption are different from the data on innovation."[5]

Assuming that research encompasses planning and that they are intertwined, the change process may be viewed as a continuum--research, development, diffusion, adoption, and evaluation. This attempt to to conceptualize the change process involves observation, description, and sensitizing and integrating concepts, all of which constitutes levels or stages in the development of theory. This conceptualization is modeled on the order of the formulations of Clark and Guba.[6]

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[4] Adopted from Robert B. Howsam, "Effecting Needed Changes in Education," in Planning and Effecting Needed Changes in Society, op.cit., pp. 65-81.

[5] Ronald Lippitt, et al., "The Teacher as Innovator, Seeker, Sharer of New Practices" in Richard I. Miller, ed., Perspectives on Educational Change. (New York: Appleton-Century-Crofts, 1967).

[6] David L. Clark and Egon G. Guba, "Effecting Change in Institutions of Higher Learning." (Address to the International Intervisitation Project of the University Council for Educational Administration, Oct. 1966).

For them, the necessary processes following upon research are: development, including invention and design; diffusion, including dissemination and demonstration; adoption, including trial, installation, and institutionalization.

Research

Many educators, unfortunately, equate development with research. "Research should solve our problems, but it's too theoretical," is an often repeated statement. Nevertheless, we are faced with the necessity of capturing and controlling extensive knowledge now emerging as a result of man's research efforts. True scientific research is concerned with the production of knowledge through the projection and testing of theory. It also designs and uses particular kinds of methodologies which establish the reliability and validity of the knowledge produced.

In contrast, development is the solution of practical problems. Development often uses the knowledge produced by research. It can use research methodologies, but it is not research.

Evidence from a recent study made by Buswell and associates revealed that only 1 of 20 Ed.D. or Ph.D graduates in graduate education entered the "hard-core" research group.[7] The same study showed that of 1954 graduates, nearly 75 percent had published no research and only 12 percent had two or more research publications to their credit. One might ask, "What are the prospects for the future?"

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[7] Guy T. Buswell, T. R. McConnell, Ann M. Heiss and Dorothy M. Knoell, "Training for Educational Research." (Berkeley, California: Center for the Study of Higher Education, 1966), p. 9.

Today "educational research" appears to be in a period of transition. Fortunately, a new generation of research methodologists, long overdue, are rising in education.

Development

The invention and design of better solutions to problems in teaching-learning may be called development.

Those who might be classed as developers fall into three categories--(1) the inventors, (2) the engineers, and (3) the product testers.[8] Most successful research and development activities are team efforts involving people who are expert in the content and methodology of the problem area.

Diffusion

Clark and Guba[9] have best described the objectives of diffusion as: (1) to make potential users aware of the existance of developed solutions, (2) to convince the user of the efficacy of these developments, (3) to develop a level of user competence with the new solutions, and (4) to complete the institutionalization of the invention. The functions which relate directly to these objectives in education are: (1) informing schools about particular developments, (2) demonstrating their effectiveness, (3) training personnel in schools in the use of these developments, and (4) servicing and nurturing the innovations.

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[8] Note: Inventors solve operating problems within a system, whereas the engineer is concerned with bringing together accumulated research, knowledge, and inventions into an organized form which can be used in creating an operating program or package, e.g., PSSC Physical Science Study Committee.

[9] Clark and Guba, Op. cit.

Evaluation

Although this paper does not concern itself primarily with the evaluation of an improvement system, a few brief comments seem in order. Each component identified thus far can and should be evaluated separately and continually. These separate evaluations should diagnose potential breakdowns and keep the system running more effectively. They should also identify improvements needed which will lead to developments on the system itself.

Implications

By the end of the school year 1971-72, the present research and development funding programs of the Office of Education alone would require an estimated 18,500 researchers, nearly 60,000 developers, and some 50,000 persons working directly on the process of dissemination or diffusion of research results. Translated into full time equivalents this would amount to:

Research Personnel	9,250 F.T.E.	14.4%
Development Personnel	30,000 F.T.E.	46.7%
Diffusion Personnel	25,000 F.T.E.	38.9%

These figures are based on projections of current Office of Education programs in terms of anticipated growth and expansion for the next five years. These estimates do not account for funding by private foundations, other govermental agencies, or more significantly, for the almost certain increase in local, state, and regional spending for research and development programs in education stimulated by the by the national programs.[10]

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[10] David L. Clark, "Educational Research and Development: The Next Decade" in Implications for Education of Prospective Changes in Society, op. cit., pp. 156-175.

Evidence that the federal government has had more experience with this kind of decision making is documented brilliantly by Price in The Scientific Estate.[11] As Price points out in his book, administrators and politicians often use the wisdom of the professional (development) and scientific (research) communities. He goes on to say that this wisdom is always looked upon as advice and only as advice. According to Price, there is a clear separation in decision-making between the political community (politicians and administrators) and the scientific community (researchers and developers). He documents a series of checks and balances which are emerging among and between politicians, administrators, professionals, and scientists.

In contrast, Blanke contends that state government, if it is to be influential at all, must become more knowledgeable about the research and development enterprise fairly quickly.[12]

In spite of an inefficient improvement system nationally and in spite of relative "newness" of RCUs, at the state level, solutions to problems in the field of education are being developed with increasing rapidity.

Change Strategies

Each of the concepts (or constructs)--planning, research, development, diffusion, and adoption as well as evaluation--obviously require additional elaborations considered beyond the purpose of this paper. In terms of identifying the strategy, however, numerous strategies exist as evidenced by a unique and comprehensive classification developed by Robert Chin.[13]

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[11] Don K. Price, The Scientific Estate. (Cambridge, Mass.: The Belknap Press, 1965).

[12] Virgil E. Blanke, "Planned Change, Public Education and the State," in Planning and Effecting Needed Changes in Education, op. cit., p. 296.

Chin builds on the work of Jones, Miles, Walton, Benne and Bennis. His comprehensive classification includes three major groups or types. The first major group, called the empirical-rational type, is the most frequently used strategy. The fundamental process is based on reason and utilitarianism. The change to be effected is demonstrated to be desirable and effective and then brought to the attention of the potential changee. Because the changee is reasonable or because he sees he can gain from using this new form of action, he adopts it.

The second group of strategies, Chin refers to as the normative-reeducative type, a fundamental process of attitude changing. The third group of strategies is based on power in some form with compliance as the fundamental process. His classification schema accomodates, Marx, Freud, etc.

As was previously suggested, the empirical-rational type of strategy is based largely upon research done in the behavioral sciences and draws more heavily on social psychology as well as organizational and systems theory, and offers great promises to both the theorist and practitioner interested in planned change. University educators are beginning to recognize the potential value of an interdisplinary approach and as a consequence have introduced a variety of courses in organizational theory, complex organizations etc. into the university curricula.

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[13] Robert Chin, "Basic Strategies and Procedures in Effecting Change," in ibid., pp. 43-53.

The work of Burton Clark, a sociologist who has specialized in both education and social theory at the University of California, serves as an example of this trend. Clark has brilliantly analyzed the interrogational efforts of groups and individuals involved in the development of science teaching materials as sponsored by the National Science Foundation. Clark identified scholars, teachers, publishers, representatives of government, among others as "change agents" in the highly successful national science curriculum improvement project.[14]

Similar work by Pellegrin has resulted in the identification of ten sources of educational innovation. From Pellegrin's list it is clear that individuals, groups or organizations all interested in change may often have conflicting views and opinions with respect to strategy, priorities, and/or resource commitment. The ten sources Pellegrin identifies are: (1) the classroom teacher; (2) the administrators (principal and superintendent); (3) the school board; (4) the lay public; (5) the state departments of education; (6) education faculties in colleges and universities; (7) professional associations; (8) the United States Office of Education and other federal government agencies; (9) textbook publishers; and (10) scientists, technical specialists, and other experts.

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[14] Burton R. Clark, "Interorganizational Patterns in Education" Administrative Science Quarterly, 10, No. 2 (September, 1965) pp. 236-7.

More significantly, Pellegrin is impressed by the fact that the greatest stimili to changes in education originate in sources external to the field.[15]

The system analysts also tell us that the major impetus for change in most organizations comes from the outside. Clearly the emphasis on pre-school education, modern foreign languages, new mathematics, and most other recent major changes have not been initiated by local schools. They have been adopted, with local modifications, but the initiation thrust came primarily from outside.

A case in point, is a study made by the Research Committee of the Southern Region itself, which revealed the disparity in the thinking of agricultural educators and the thinking of others regarding the goals of high school vocational agriculture students. An extensive study of the opinions of layman and school administrators in the several states of the Southern Region of the United States revealed that only 45 percent believed that the goal of vocational agriculture in the high school is to prepare boys for farming.[16] To what extent the total impact of this impetus for change will be felt still remains to be seen.

To state that many factors will influence future changes in vocational education in agriculture is an understatement. However, in summing up, it seems to me that the implications for change within the educational community, including both the vertical and horizontal dimensions of occupational education, are not only many, but more significantly, are upon us. I would like to close by quoting a statement credited to David Clark. The educational research community will be the educational community, and the route to educational progress will self evidently . . . be research and development.

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[15] Roland J. Pellegrin, "An Analysis of Sources and Processes of of Innovation in Education," (Eugene, Oregon: University of Oregon, Center for the Advanced Study of Educational Administration, 1966), pp. 6-14.

[16] Cited in Herbert M. Hamlin, Public School Education in Agriculture (Danville, Illinois: Interstate Printers and Publishers, 1962), p. 121.

APPLICATION OF THE CHANGE CONSTRUCT IN AGRICULTURAL EDUCATION

Douglas C. Towne, University of Tennessee

I would first like to react to two points made in the previous presentation. The first takes issue with the idea that research, diffusion and development are separate entities. This view ignores advances coming in the future, i.e. information technology, as well as the interrelationships which exist upon this continuum which ranges from research to application. In addition to this separateness, innovations are also viewed as separate entities. As separate entities, we are unable to give credit to various interactions that are involved between separate innovations such as the interaction between a new science curriculum with a new vocational-technical curriculum.

The second point relates to the fact that most of our educational change theories are based upon the present education system. Education is not a natural phenomenon as is human growth or plant science. It is rather a man-made phenomenon. Basing our change theories on education today does not give proper credit to the fact that education can be changed. There should be nothing sacrosanct about the educational system.

When we discuss the change process, most educators come up with a great number of questions. I do not propose to answer a lot of these questions. I would rather speak to you on the question of "How to implement this change process." I would consider myself successful this morning if we made some differentiations between the questions which should be asked. The first basic concept I would like to present relates to the definition of change. Just what is change?

The common garden variety definition of change is movement. Movement of a pyramid in this direction or that direction. Change can be positive or negative; it can go in many directions according to this definition of change. But this is not the appropriate definition of change. Change does not mean movement. Change, rather, means replacement. We replace the pyramid with a cube. We get rid of A the pyramid and put in its place B the cube; or we put in its place C, a spherical configuration.

The education change process we will discuss this morning is change in classroom situations. But this process applies equally well to the student in the vocational agriculture program, or the teacher, the state supervisor, teacher educator, researcher, and others. When we talk about change in education in relation to the student, (after all the student is the end justification for any person working in education) we are talking about knowledges, attitudes, and skills. (To use the terminology of Bloom & Krathwohls' Taxonomy of Educational Objectives; the cognitive domain, the affective domain, and the psychomotor domain.) The reason we want to make changes in these three domains is that they, combined with environmental situations are the determinates of behavior. Educators are interested in changing behavior.

In the model illustrated in Figure I, we start with our objectives (1) as mentioned by the prior speaker. In education we are concerned with the students (2) achieving these objectives. In other words, we want to replace some knowledges, attitudes, and skills that the students now have with those we feel are more desirable. We go about this by

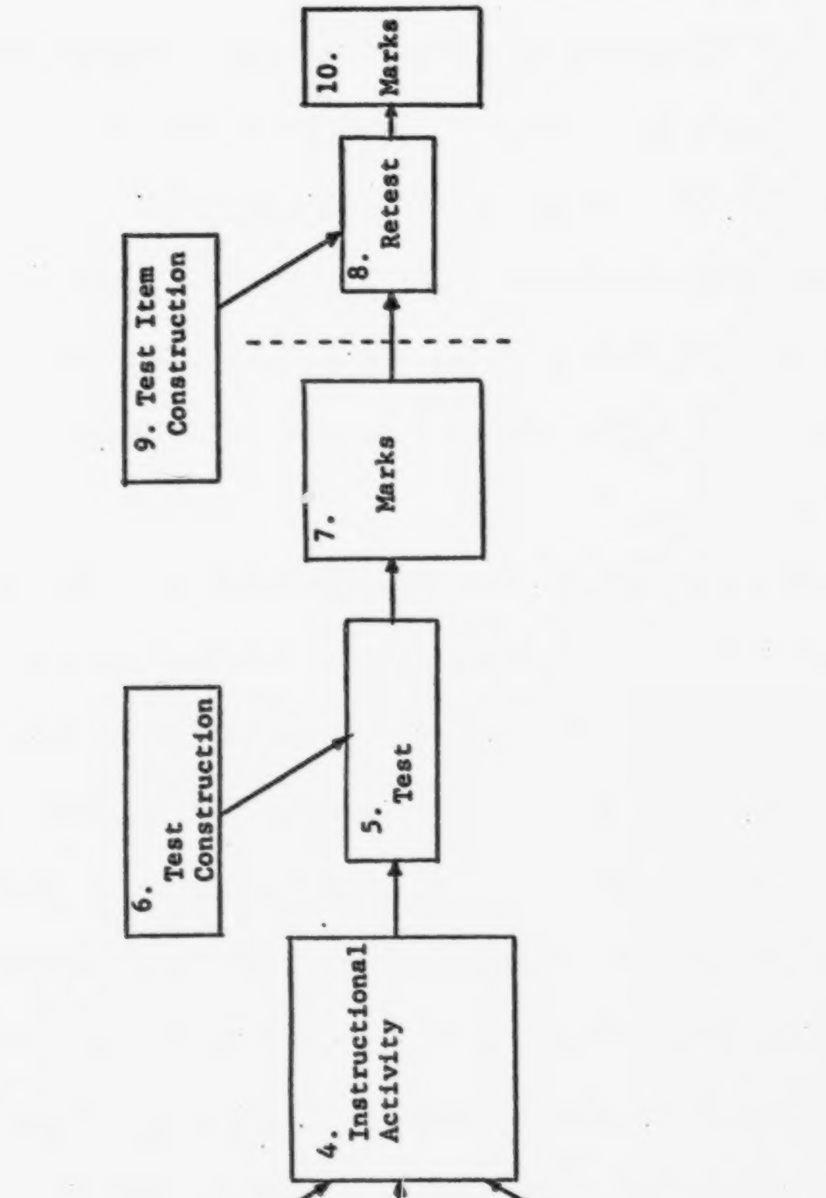
1. Objectives
2. Students
3. PLANNING
a. Material Selection
A B C
b. Methods Selection
A B C
c. Student Assignment
A B C D
E F G
4. Instructional Activity
5. Test
6. Test Construction
7. Marks
8. Retest
9. Test Item Construction
10. Marks

Figure I

planning (3) our activities. This consists of three sub-parts: (3a) selection of materials, in other words, what text are we going to have the students read; (3b) selection of our methods, how are we going to get these points across to the student; and (3c) student assignment, we assign our students to the methods and materials that we have selected. From here we develop our instructional activity (4) based upon the materials, methods, and the students we have assigned. After our instructional activities, we test (5) the students for achievement. This means that we have to construct the test (6). After we have given that achievement test, the teacher records and posts the marks (7). After a period of time, the teacher gives a test for retention (8), i.e. the final exam. Now this, of course, requires test item construction (9) and recording and posting of marks (10). Within reason I think you will generally agree that this model portrays the situation in Agricultural Education and in most other instructional situations occuring in public education.

As I mentioned earlier, change is defined as the replacement of A with B. Education, or more appropriately learning, is the replacement of attitude A, knowledge A, or skill A with attitude B, knowledge B or skill B. Learning is change. But change is replacement of A with B, therefore, we cannot determine whether or not we have created any change if all we do is measure B, because the students may have come to us in possession of B. We see then that the model as presented is inadequate. We have to add an item which is called the pretest (11). In other words, we have to look at our students before the process gets under way to determine whether or not they have already in their possession item B. So the arrow does not go directly from students to planning as usually conceived but rather from students to pretesting and then to planning.

There are certain pretests that we do presently utilize but we don't utilize them to any great extent. We must know the student's capacity prior to the instructional activity as well as after the instructional activity. Otherwise, how can we evaluate the process, i.e. instruction, that went on in between? At the present time we assume all students come to us with a complete lack of those capacities included in our instructional objectives. This may be the case or it may not be the case. This pretest is used then only as a benchmark. If student differences are expected and they are empirically demonstrated by the pretest, then we would certainly benefit by using this pretest also as a diagnostic test. Let's then call it a diagnostic pretest. By diagnostic I mean that we can look at the results of a pretest and diagnose the students needs in order to group our students accordingly.

We might say for example that students A and B are similar so we work with them together. Whereas C presents a separate case and must be worked with individually; D and F make up a third group while G is a completely different individual than any previously considered. There are other alterations available now such as material and method selection. The teacher presently has materials A, B or C to select from and he will usually pick one of these three. This is also true of the selection of methods A, B or C. These are finite numbers. With our new model, we can look at our students not as a single group of students but rather as individual students, using the pretest both for a benchmark for comparison at a later time and also for diagnostic purposes in order to vary our teaching approach. The diagnostic test, therefore, allows an individual approach to learning. Students may be assigned to smaller group situations, working with different materials and different methods.

Some teachers feel more comfortable and effective with some teaching methods than they do with other teaching methods. Let us insert then the teacher as a most important aspect in this model. We usually tend to overlook the teacher. However, research indicates that there is a great interaction between the teacher and innovation in the classroom. Not only do we have to include the teacher in order to assess change, but we really need a critical assessment of that teacher and the teacher's various characteristics. I would suggest then that we add to our original model some kind of teacher assessment. Simply due to the fact that some teachers work better with some innovations than they do with other innovations, and therefore perhaps we can tailor our innovations on this basis.

Just as teachers work better with some methods and materials than others, so do students. Therefore, we must obtain information on individual student learning styles. Some students learn very well merely by reading the book, whereas others have to have a more practical experience. We need information on how these students learn. This is in addition to the content in diagnostic pretest. Learning styles differ. In other words, some students learn very well by reading, some learn by self-instruction, some by group instruction, etc. Such a diagnostic pretest would allow greater individualization of instruction. With such capacity for individual instruction, it will be necessary to increase the kinds of materials at the disposal of the student and the teacher. We need more materials than are normally available in the classroom. So let us add a system which allows for the addition of D, E, F, G and H materials and also allows for the addition of D, E, F, G and H methods. In other words how can we make available to the teacher and the student a greater source of material and a greater source of methods? Our best bet for accomplishment of this is to initiate a selective dissemination procedure. If information is put into an automatic, computerized or mechanical system, the teacher would have greater access to the materials and methods available. This is technically feasible but is not in practice to any great extent at this time. If we were to have this greater supply of materials and methods, we would have to have a process for selectively disseminating this information.

If we have this greater capacity for individualizing instruction, students will necessarily vary in the number of objectives they attain in a specific period of time. They will also vary in learning styles. We, therefore, need this greater access of material and methods in order to tailor our instructional activities to meet these differences. So rather than having a single block of time, we must have a flexible schedule to allow time to vary for individual students. Some students will be able to obtain objectives in two periods whereas others will require ten periods. I think you would all agree that we should allow our students to learn at their own rate.

Now the reason or purpose for investing time in an instructional activity is to allow students to achieve mastery of the stated objectives. We must stipulate these objectives whatever they may be. The overall purpose of our educational system is student achievement, not at the 70 percent mark, but at a level sufficient for performance, i.e. mastery. Usually our students do not achieve "mastery." If we, for example, assign a student the mark of A, this means that he has mastered that subject matter. However, what of the students that do not achieve the mark of A, this really means that they have failed to master the subject. We must allow our students to master the stated objectives whether it takes them two days, five days or ten days. After all the overall purpose of education is mastery.

This indicates then that our objectives need to be subdivided into managable units in order to develop appropriate measures of mastery for each. Once we have these unique units, we can develop evaluative measures tied directly to our objectives. The pretest must assess these objectives. If a student, for example, has achieved example #2 then there is not need for him to work on objective #2. The statement of objectives, therefore, influences both our diagnostic pretest and our final test. The important measure in our achievement test is not the percentage of knowledge failed as is indicated by a 70 percent mark or really 30 percent failure but rather an assessment of mastery of the stated objectives. In addition to assessing this mastery, we need to determine how long it took each student to achieve this mastery. How long did it take student A in instructional activity B to obtain objective 1, 2 or 3. Let us accept the fact that some of our students will achieve more objectives while some will achieve fewer objectives. The ultimate, however, is mastery of objectives. The posting of marks then will indicate the length of time it took the student to obtain objectives number X, Y and Z.

Selective dissemination of information means that we disseminate information in a selective manner. We can mechanically identify certain information which relates to objective #2. Other information which relates directly to objectives 3 but not to #1 and 2. We can therefore selectively disseminate this information on materials or methods according to specific objectives if these are identified and well defined.

Recording and posting marks is not a professional activity. This is purely clerical or mechanical in nature. We as educators are not going to become professional if we continue to devote time to such labor. The analysis of data resulting from instructional activities, however, is a professional function. Looking at such information, analyzing it and making judgments, is the more professional aspect of teaching. I would propose that most teachers would be happy to have these clerical tasks assigned to a machine.

I have illustrated with the model in Figure II a number of different and distinct variables involved in the directed learning process. In order to assess the effects of innovation at any point it is necessary to control or otherwise account for these variables. We have shown that teachers interact and students interact to complicate research findings in educational situations. We must, therefore, apply a longitudinal research approach. With this "messy" model of education we can apply the longitudinal research design and more appropriately control and account for many of the variables inherent in the learning situation. In addition, we can easily appreciate the need for a multivariate research design. A single variable or two or

RELATIONS WITH OTHER SYSTEM ELEMENT

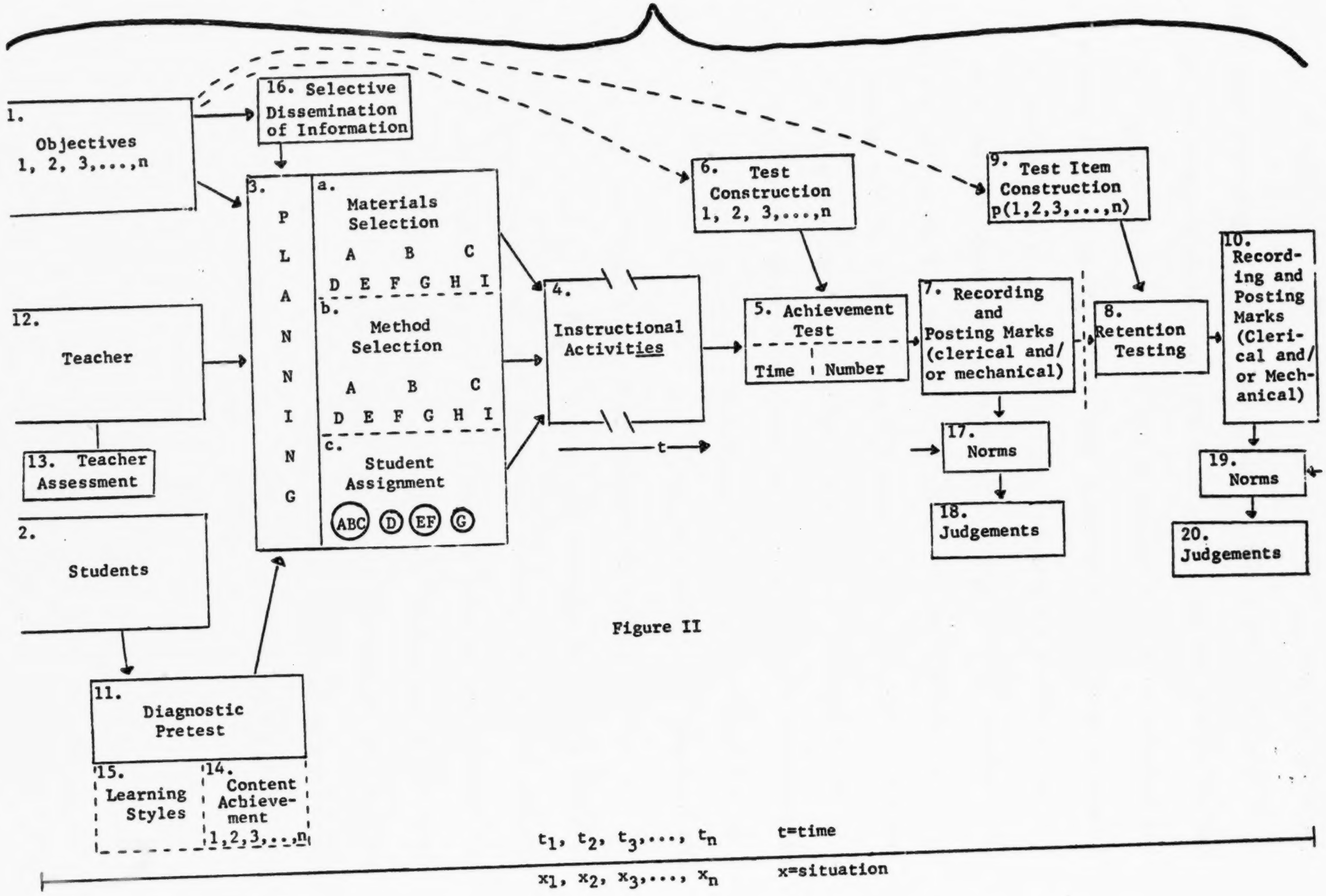
1. Objectives 1, 2, 3,...,n
16. Selective Dissemination of Information
3. PLANNING
a. Materials Selection
A B C
D E F G H I
b. Method Selection
A B C
D E F G H I
c. Student Assignment
ABC D EF G
12. Teacher
13. Teacher Assessment
2. Students
11. Diagnostic Pretest
15. Learning Styles
14. Content Achievement 1,2,3,..,n
4. Instructional Activities
t
6. Test Construction 1, 2, 3,...,n
5. Achievement Test
Time
Number
7. Recording and Posting Marks (clerical and/or mechanical)
17. Norms
18. Judgements
9. Test Item Construction p(1,2,3,...,n)
8. Retention Testing
10. Recording and Posting Marks (Clerical and/or Mechanical)
19. Norms
20. Judgements
$t_1, t_2, t_3, \dots, t_n$
t=time
$x_1, x_2, x_3, \dots, x_n$
x=situation

Figure II

even three variables are usually inadequate to account for this total learning situation.

Finally if we accept Marshall MacLuhan's suggestion that "the medium is the message" I am sure that we can appreciate the far reaching affects of such a medium as the model presented today. All which I have proposed is technically within our grasp. Such a medium would consist of three subsystems: (1) A selective dissemination of information system; (2) a technical information exchange system; and, (3) a data analysis and systems evaluation system. I do not have time to present or discuss these three systems with you at the present time, but let us suffice to indicate that such systems are presently in existance in various activities and are working effectively. However, I do not know of any which combines all three in the same system to the business of directed learning.

In conclusion let me remind you that we have 365 days a year, 24 hours a day, 60 minutes in an hour which gives us a total of 525,600 minutes per year. But as we know 1967 has already slipped by and 1968 is pretty well along. When are going to get down to the brass tacks and accept education as a man-made phenomena, something that we can change and improve? We need also to accept the fact that such a system can be assessed, analyzed, and altered on a scientific and intellectually honest basis.

COMMENTARIES

Earl Webb, Texas Agricultural and Mechanical University

I am not real sure of my reaction to the two presentations. I want to agree with Bob's statement that education is an instrument of society. As a group within society, we as educators help to bring about and establish goals which make life better for everyone. We have tended to organize ourselves in a sort of aristocracy. Sometimes we get the idea that we are the individuals to establish goals for people. We act like we know what is good for all the people. This is wrong in my opinion. We are a group, an organized group, supported by the society in order to achieve the aims of society. Frequently we fail to communicate with the clientele we serve, namely the people in this nation. We establish a set of goals to be achieved, but fail to impress on those we teach the real purpose of education. Let me give you an example.

I recall substituting for a teacher of college students who had been studying the 7 cardinal principles of secondary education. They had passed an examination and I had asked one of the students on this particular day, "What does worthy home membership mean?" He looked rather surprised and said, "You know I've wondered that too; you know it seems everybody is worthy of a home." One of the problems encountered has been a failure on our part to accept responsibility for the teaching-learning process. In teacher education there is nothing more important than to help prospective teachers understand the role they are to serve in education. Now if goals have been established by society, we must understand the function we serve in the education process. It is impossible to evaluate a teaching-learning situation unless we know why we are doing it.

And I would say this to those of us who are concerned with change. One of the oldest books we own provides us with one of the finest examples of how change can be brought about. This is the Bible. The development of Christianity could not have occurred without change. The apostle Paul recognized that information had to be called to the attention of the people when he said "How can they hear without a preacher?" Then he said "faith cometh by hearing and hearing by the word of God." You just have to know about these things. And this is the thing that we must keep in mind: We must convert people to a cause. And always the cause is developed by the society in which we live. In my opinion this is something we must never overlook.

Charles Rogers, North Carolina State University

Both speakers took a look at the nature of change; one from a theoretical basis dealing with the relationship between the change agent and the client system, and the other dealt with an operational aspect of change. Both speakers handled their topics very effectively. But, as I listened to Dr. Towne's definition of change, I was left a little bit confused. Doug, you indicated that change equals replacement, as opposed to movement or some type of reshaping. I have some difficulty in my own mind seeing this unless it is a means of operationalizing your model. I contend that change can come about in at least three ways: (1) You can take a ball of wax and reshape it. This is one type of change, or (2) You can actually move objects from one place to another. Change can occur as movement. An example of this would be moving that pyramid that you mentioned over on my foot. This would definitely produce a change in the situation from what it was originally! (3) Change can also take place by replacement. It may well be advantageous to use the "replacement" definition of change to operationalize a model, but I submit it is only one definition or only one part of the definition of change.

Lowery H. Davis, Clemson University

I think I would agree basically with what these gentlemen have said. However, I would like to ask them some questions. Dr. Meisner, how does the change process in education differ from that in medicine or agriculture?

MEISNER--I would like to respond to this on the basis of what we know about organizations. First of all, organizationally speaking, education is a service organization. Matthew Miles describes it as a domesticated organization. We tend to care for educational organizations differently than we would for a profit-making organization or an organization with commonweal goals. Basically I feel that change within education is different because of the relationship that exists between participants. Because of the relationship existing at different levels among participants, education tends to resist change more than other organizations. Education tends to lag in terms of change within the organization when compared to other groups. We look at change as it happens within groups. We recognize the nature of organizations is not the same. We are talking about the process of attitudinal change.

WEBB--Isn't there a hierarchy within the educational system? It seems to me that university professors are quite articulate in advocating change except on their own campus. I happen to be chairman of the curriculum committee at Texas A&M. I know some of the problems that can come up.

DAVIS--Dr. Meisner indicated that many of the changes in education came about as a result of outside influence. I certainly agree. I have followed with great interest the modern math movement which is advocated by the mathematicians. Some of these innovations will be incorporated into the system; some will be cast off. Twenty years from now the present rabble arousers will become the mossbacks so we will have a new revolution. Some of the current innovations will have become a part of the system. My question is, "Is it bad for changes to come about because of outside influences?" It comes back to what Earl said earlier: Change is a part of our responsibility to society; the society we represent and should be perpetuating.

MEISNER--Much of what we react to is change within our own group. We have institutional leadership and we tend to listen to these leaders. Conant is an institutional leader who has had tremendous influence. As we look back in time we can identify Rickover. They have had some kind of an impact on education. When we talk about change from within, we have to identify which particular subgroup we are responding to. We happen to live in a pluralistic society. Policy formulation almost defies analysis. A lot of what happens in education goes back to policy. This process may slow down change but it works as a sort of check and balance in terms of where we are headed. A pluralistic society is more capable of righting itself than one which is not pluralistic.

DAVIS--It might be well that these changes come about because of outside influences. I have watched school superintendents come and go in public schools. They "went" because they were ahead of the populace so maybe it is better if we can get changes to come about as a result of outside influence rather than attempting to do it from the inside.

MEISNER--I think there is involvement here. That is what I meant when I used the word colaborate. Colaboration begins before planning. It begins with the setting of goals. Otherwise I don't think we have goals; we are trying to impose something. We as educators probably find ourselves in a delimma because we tend to rule out the opinions of others.

WEBB--It seems to me that in education today we are confronted with the problem of individual student differences. We are concerned with the student that will make us look good as individual teachers. We have little concern for the student who may have greater need for help. Higher education today is selecting the student that will make the institution look good. We are not too concerned with what happens to the student who needs help.

MEISNER--This starts long before college.

ROGERS--I think this whole idea that you brought up, Earl, is one that we ought to address ourselves to in the conference. If change has any meaning to us as agricultural educators, what are we going to do during the next few years about all of the concerns of the federal and state government about the economic and socially deprived student? First, what role does agricultural education have in shouldering the burdens of this problem? To me this is one of the greatest opportunities for change that we have in agricultural education. I believe that we have done too much of the very thing that you have talked about, Earl. We have looked at the things that made us look good. We wanted to work with a student that could progress the farthest, rather than looking at the student who really needed us the most. We have been right out into the rural poverty areas ourselves and have not taken the challenge. I would just throw this out as a challenge to us as teacher educators and researchers to figure out some ways that agricultural education can accept its role and make a real contribution to this effort that is being pushed on the national as well as local levels.

STEVENSON--I would like to hear Doug comment on how this student fits his model.

TOWNE--There are four points that I would like to comment on. I like a symposium or panel because it gives the speaker a chance to finish his speech. Curriculum is defined as a structured series of intended learning outcomes. This is the input to our instructional process which I have discussed. I refer you to another system, equally complex, which leads into the curriculum. Society is involved in setting up a curriculum from which we can derive our objectives. This is where society's aims and values should be involved. In other words, these are the things that we want for our children. From that the teacher moves into the statement of the objectives. But we begin with the aims.

MEISNER--Is this exclusively the teacher's domain?

TOWNE--No, not by any means, but primarily this is the educational process. The teacher, researcher and teacher educator are all involved. The second point was mentioned by Charles Rogers in the definition of change. Reshaping is alteration, not change. Movement is movement. For example with a pyramid, when I move it over to Charlie's toe, what I'm doing is replacing atmospheric pressure bearing on his toe with a pyramid bearing on his toe. It's hard to see the value of such a fine distinction, but I think we must because replacement gives us an entirely different concept than does movement or alteration. I think replacement is the critical aspect. Yes, I was moving the pyramid physically, but what I was replacing was the atmospheric pressure with a 10 ton pyramid.

ROGERS--I still have to take issue with you. I submit that replacement is replacement just as movement is movement. If you get right down to it, you're trying to find some definition that is mutually exclusive, and will serve to operationalize your model. Replacement means you can physically substitute something. You could substitute one cup for another. Using your own argument, this is not change; it is replacement.

TOWNE--I refer you to Oxford's English Dictionary. I have looked at the definitions of change in the best dictionary. It is critical that we use terms as appropriately as possible. There are times when we use a garden variety of definitions. This is one of the things that has been holding us back. Secondly, this system that I have outlined incorporates outside influence. It's a median. In other words, the median is the message. Television has presented us a completely different message. The radio, the wheel, the auto, all of these are medians, and represent extention of our senses. This system could be programmed to identify that student when he enters and when he leaves. The system could be programmed to refer back to the teacher, what happened to Johnny Jones.

ROGERS--Doug, let me hitchhike on your statement a little bit. I wanted to raise a question about the use of norms and their relationships to students. You say that these norms are needed to help make judgments about marks or scores. How do you justify the use of norms in the traditional sense? How do you make a judgment about the progress of students who come from the various groups?

TOWNE--I'm not sure that I understand your question.

ROGERS--At one point of your presentation, you indicated the use of student assignments based on diagnostic tests. You need norms in order to make judgments about the accomplishments and progress of the students. It seems to me that you do not go far enough to say how these norms will be determined and what kind of norms you are talking about.

TOWNE--Well, the norms that I am talking about are from the system. They are not the usual nationalnnorms indicating how 8th graders react on a test. National norms are too general. But these norms are generated from the system itself. In other words, we have norms on individual learning styles. We have norms on individuals' pre-tests. We have norms on the achievement post test. The norms are from the system. They are tailored to the objectives.

JONES--How long do you think it would take for these norms to become traditional with these groups that you have identified?

TOWNE--I hope that they would never become traditional. I hope that they would be continually changing. This is one of the problems with change. We try to predict 1980 or the year 2000. The prediction will change because it is based on today's situation.

EDINGTON--Aren't you losing a little bit of value in this system when you categorize these students into groups? You are supposed to treat these students as individuals.

TOWNE--I am trying to point out an individual approach here, but not every student works best individually. Many students work best in pairs; other students work best in 3's or 6's or a group of 10. What we are saying is that you don't have to do everything individually.

EDINGTON--You might have different groups doing different things.

TOWNE--Yes, definitely.

AUDIENCE QUESTION--Under your achievement test, you show time as being an element of measuring achievement. As far as I'm concerned, time is something that transpires, but I'm concerned with mastery not time.

TOWNE--Mastery is the important thing, but in achieving mastery, different students are going to take different lengths of time. So I would like to know how long it takes different students to achieve mastery. This should be tied back to the characteristics of materials and methods. One method reduces the time involved; another method increases it.

BAKER--There are theories dealing with how we arrive at objectives. I think we have always been long on the historical and philosophical foundations in trying to determine educational objectives. We never have been able to deal effectively with social economics. Until we can do this in agricultural education and vocational education in general we will continue to have the problems that we have in our society.

MEISNER--I would like to respond. I suggested that a focal point must be the interaction between the change agent and the client system. If you look at different stages in the change process, the interfacing between these two become a very critical point. That is the reason I suggested that behavorial scientists look at organizational theory. I personally feel that social psychology will offer, in the long run, more of the solutions than any of the other disciplines.

KILLIAN--One of our charges in vocational education today is the development of programs for persons of all ages and all levels. Will this program reach the zero reject concept of training? In other words, can we take care of all students? Can we take the real slow learner and program him all the way through where he would not be rejected?

TOWNE--I don't think this guarantees success by any means. The system is designed to make it easier for teachers to do their job. Humans are always going to fail so there is nothing to guarantee success. If you have a bad teacher working in this system, then you are going to have bad results.

BROWN--I am not sure that the system described is going to make it easier for teachers. It may, in fact make their instruction harder. Instruction is going to be much more complex because the system calls for more inputs with special attention focused on individual needs of students. A question to consider may be: "What kind of training or retraining programs will be necessary in order for teachers to work effectively in this system?"

TOWNE--I think it is going to be easier in the sense it is going to be easier for the teacher to be a professional. It is going to be easier for a teacher educator to be a professional which means it is going to be harder. I mean, if you are going to do a professional.job, it should be a harder job.

Predicting Change

VARIABLES INFLUENCING TEACHER ADOPTION OF COOPERATIVE AGRICULTURAL OCCUPATIONS CURRICULA

David L. Williams, Oklahoma State University

A major responsibility of teacher educators and supervisors in agricultural education is to help keep vocational agriculture programs in tune with rapid changes taking place in our dynamic society. With a reduction in the need for personnel in production agriculture, the pressing need in agricultural education is to supplement production agricultural training with experiences which will equip young people for non-professional, skilled employment in off-farm agricultural occupations.

For changes to take place in local departments of vocational agriculture, it is frequently necessary to modify teacher knowledge and skills. In this regard, teacher educators and supervisors can initiate and conduct retraining programs, such as workshops, institutes, and other inservice activities. Retraining programs could serve as one means to stimulate and train teachers to adopt innovations that will more effectively meet the needs of their clientele.

In keeping with the theme for this conference "Research in Understanding and Implementing Change in Agricultural Education," attention is focused on variables influencing teacher adoption of cooperative agricultural occupations curricula as revealed by one study conducted in Oklahoma. To understand the objectives of this study, it will be necessary to digress for a moment to look at some background information.

During 1965 and 1966, the Agricultural Education Department, Oklahoma State University, conducted an Institute consisting of two summer workshops to train sixty vocational agriculture teachers for conducting cooperative agricultural occupations training programs in secondary schools. Evidence available from the Institute indicates teachers mastered the competencies needed to implement cooperative agricultural occupations curricula, yet their program outcomes appeared to vary greatly.[1]

The problem with which this study was concerned is: Why were these teachers not equally successful after receiving the same retraining? Consequently, this study was designed to: (1) determine the relationship between teacher innovativeness and diffusion of cooperative agricultural occupations curricula into the vocational agriculture program, and (2) isolate and relate situational variables in the school and community which were associated with deviation from the expected result, adoption of the innovative program. A direct relationship between innovativeness of the teacher and degree of program adoption was hypothesized. Potential intervening variables considered in this study included:

A. Administrator's attitude toward cooperative agricultural occupations training

B. The school's per pupil expenditure

C. The number of agricultural training stations available in the community

D. The number of teachers in the vocational agriculture department

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[1] William L. Hull, et al. Developing Occupational Experience Programs in Agricultural Distribution. Stillwater, Oklahoma: Oklahoma State University Research Foundation, October, 1967, p. 18.

E. The number of students enrolled in vocational agriculture

F. The number of non-farm students enrolled in vocational agriculture

G. The number of vocational education programs offered by the school

H. The offering of a separate agricultural mechanics class in the vocational agriculture program.

Teachers included in the study were the thirty-two Oklahoma teachers participating in the Institute who were still teaching vocational agriculture in the same school as they were when enrolled in the Institute. Also included in the study was one administrator in each of the schools where these teachers were employed.

The study required the development of three major data-gathering instruments to be used in personal interviews. They included a diffusion scale, a teacher innovativeness scale, and an administrator's attitude scale. Since the diffusion scale served as the criterion measure for the study, its construction will be presented in some detail.

The diffusion scale was designed to measure the nature and extent of diffusion of cooperative agricultural occupations curricula into the vocational agriculture program. To select the items for the diffusion scale, 36 statements were formulated with each item describing one aspect of the innovation. A jury of five individuals knowledgeable of cooperative occupations training and the diffusion-adoption process was used to obtain ratings on each item. The jury classified each item along a five point diffusion continuum considering equal intervals between points. Classifying an item in the number 1 category meant that it exemplified conditions in a situation where only the earliest attempts were made to diffuse the concept into the program. Rating an item as number 5 meant that programs meeting this criteria have completely incorporated the innovation into their program.

The 13 items selected for the diffusion scale included the ones with greatest agreement among the judges; that is, responses were contained in three adjacent categories or less. Three items were selected as classroom exemplars, five items as school system exemplars, and five items as community exemplars. A mean rating for each of the items was determined by averaging the judges' responses. Through a personal interview with each teacher in his vocational agriculture department, each program received credit (mean rating) for items exemplifying its situation. In this manner, a total score representing the extent of innovation diffusion into the total vocational agriculture program was derived for each department.

The innovativeness scale, frequently referred to as a time scale, was developed to provide a means to measure the degree to which an individual is relatively earlier to adopt new ideas and practices than other teachers. To determine the innovativeness score for each teacher, a procedure developed by Christiansen[2] for use in a study of the adoption of educational innovations among Ohio teachers of vocational agriculture was used. By considering the length of time it took a teacher to adopt an innovation and the number of innovations adopted that were applicable to his situation, an innovativeness score was determined for each teacher.

To measure the administrator's attitude toward cooperative agricultural occupations training, a Likert-type scale was constructed. This scale, consisting of statements concerning cooperative agricultural occupations training, was constructed so that the response made by individuals with the most favorable attitudes received the highest possible weight. For each administrator, a total score was obtained by summating his scores for the individual items.

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[2] James E. Christiansen. "The Adoption of Educational Innovations Among Teachers of Vocational Agriculture." (Unpub. Ph.D. dissertation, The Ohio State University, 1965), pp. 55-56.

In addition to these three major instruments, interview schedules were constructed to assess variables related to the school, community, and the vocational agriculture department.

Because of the nature of this study, at least two limitations should be recognized. They are as follows:

1. The study was based on an ex post facto design. Therefore, it was not possible to control or manipulate independent variables.
2. Since only nine elements were considered, the possible effect of other elements on the criterion is unknown.

With this background concerning the objectives of the study and procedures followed in collecting data, attention will be directed to findings that emerged from the study. Emphasis will be placed on the relationship that existed between the diffusion of cooperative agricultural occupations curricula and personal and situational variables in the school and community. To conceptualize findings of this study, programs have been grouped according to stages in the diffusion process. The stages include: interest, evaluation, trial, and adoption. The awareness stage is not used because it was assumed that all teachers were aware of the innovation through their participation in the Institute. It should be kept in mind that for the purpose of testing relationships between variables, diffusion scores (rather than stages of diffusion) were utilized.

The study revealed that four independent variables had a simple correlation with diffusion which is significant at the five percent level of confidence or better. They included: (1) the number of vocational agriculture teachers employed by the school, (2) the total number of students enrolled in vocational agriculture, (3) innovativeness of the teacher, and (4) the number of non-farm students enrolled in vocational agriculture. Let us take a closer look at these relationships, in order of their degree of relationship.

The number of vocational agriculture teachers employed by the school was most closely related to diffusion of cooperative agricultural occupations curricula into the program. The coefficient of correlation was .603 which is significant at the one percent level of confidence.

Of the schools included in the study, twenty-four had one teacher of vocational agriculture, seven had two, and one had three. Data in Table I show the distribution of the number of teachers of vocational agriculture in relation to stages of diffusion of the innovation. You will notice that all multiple-teacher departments were past the evaluation stage and a majority had adopted the innovation.

TABLE I

NUMBER OF VOCATIONAL AGRICULTURE TEACHERS BY STAGES OF DIFFUSION

Number of Teachers in Department	Diffusion Stages			
	Interest	Evaluation	Trial	Adoption
Single-Teacher Departments	9	7	5	3
Multiple-Teacher Departments	0	0	3	5

Two-thirds of the single-teacher departments were below the trial stage, and nearly 38 percent were only at the interest stage of the diffusion process. Only three of the twenty-four single-teacher departments had adopted the innovation.

The relationship that existed between the total number of students enrolled in the vocational agriculture program and diffusion was expressed by a coefficient of correlation of .585, which is significant at the one percent level. There was a range of 33 to 142 students enrolled in vocational agriculture among the schools included in the study.

Figure 1 shows the mean enrollment for departments when programs are grouped according to stages of diffusion. It can be observed that the mean enrollment increased as stages of diffusion increased. The mean enrollment for programs at the interest stage was 45.6 compared to an enrollment of 78.6 for programs at the adoption stage.

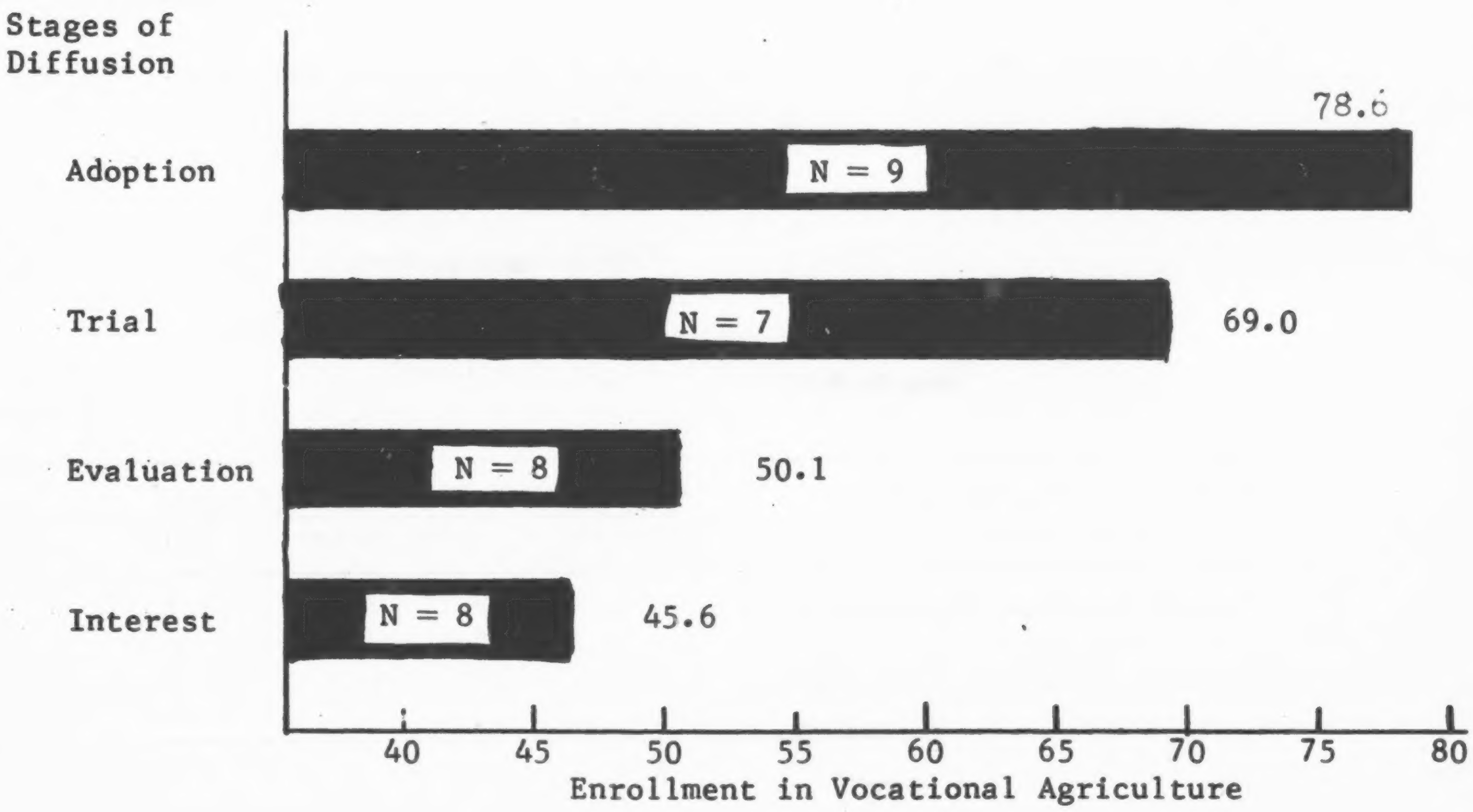

Figure 1. Enrollment in Vocational Agriculture by Stages of Diffusion

Innovativeness of the teacher was also closely related to diffusion. The coefficient of correlation was -.510, which is significant at the one percent level of confidence. This correlation was negative because the lower the score, the more innovative the teacher. In other words, innovativeness is the average length of expired time (years) for a teacher to adopt an innovation.

Figure 2 will help to visualize the relationship between teacher innovativeness and diffusion of the innovation. With the exception of programs at the interest stage, the mean number of years that expired before a teacher adopted an innovation decreased as level of diffusion increased. The mean teacher innovativeness score for programs in the adoption stage was 13.0. The greatest mean teacher innovativeness score (27.5) was for programs in the evaluation stage.

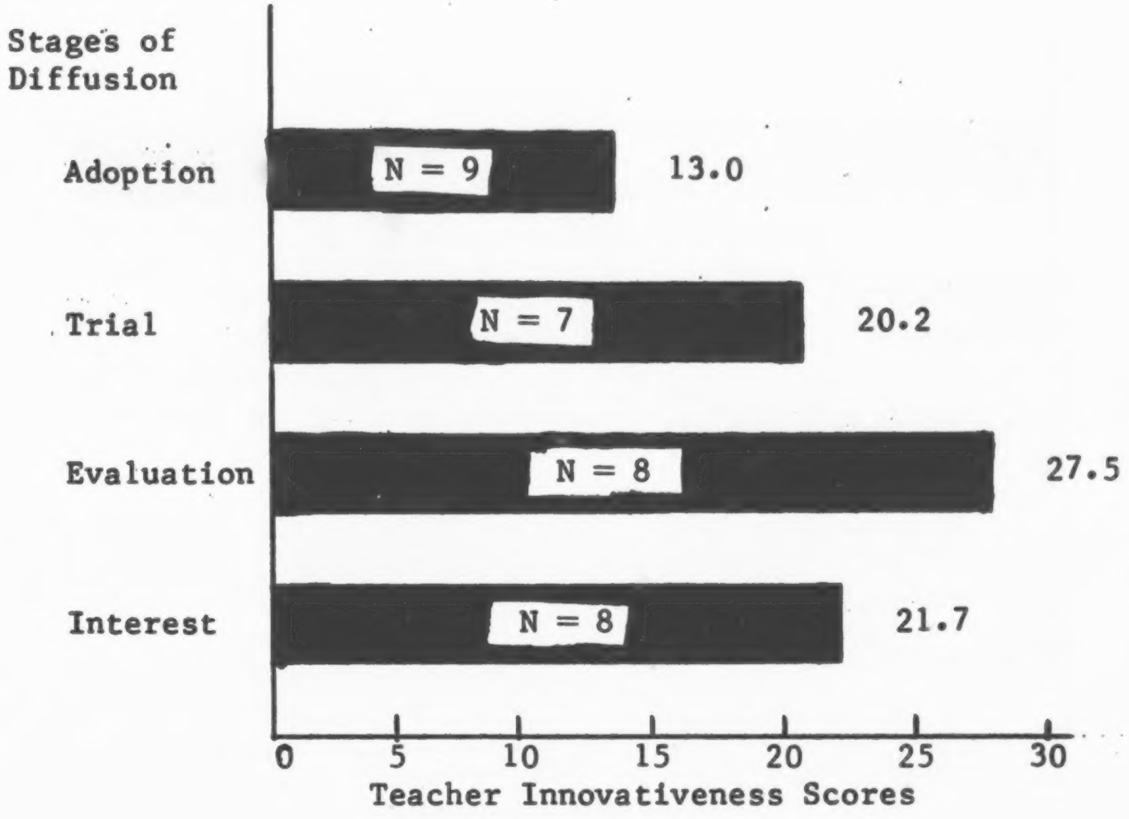

Figure 2. Teacher Innovativeness by Stages of Diffusion

A significant correlation (.465) also existed between the number of non-farm students enrolled in vocational agriculture and diffusion of cooperative agricultural occupations curricula. This correlation was significant at the one percent level.

A non-farm student was defined as a student whose parents earned less than fifty percent of the family's net income from production agriculture. The mean total enrollment in vocational agriculture for departments included in the study was 60.69 and the mean non-farm enrollment was 41.38

Figure 3 shows that non-farm enrollment increased as stages of diffusion increased. The mean enrollment for programs in the interest stage was 30.4 compared to a mean enrollment of 57.0 for programs where the innovation had been adopted.

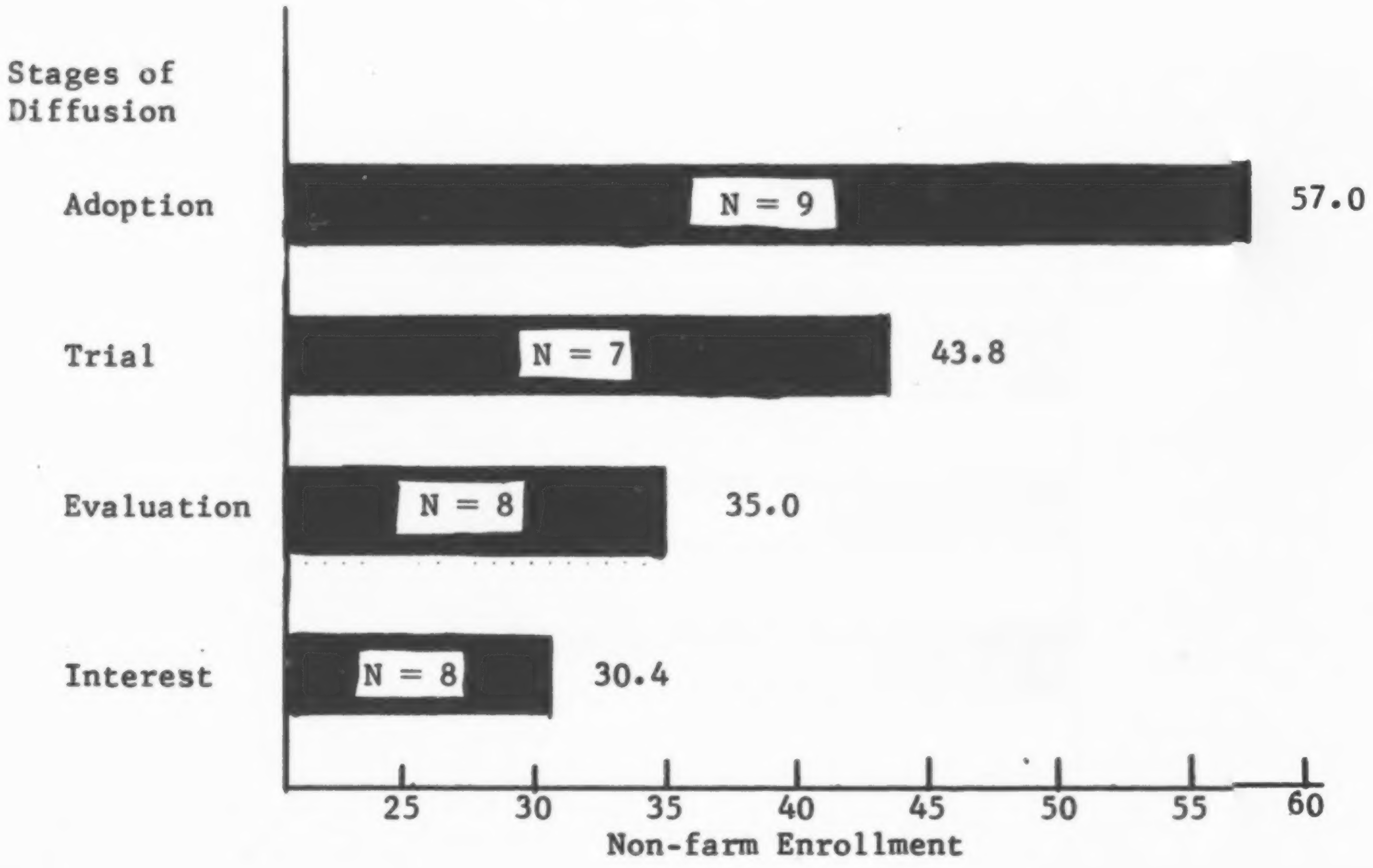

Figure 3. Non-farm Enrollment in Vocational Agriculture by Stages of Diffusion

The variables considered in this study that were significantly related to the diffusion of cooperative agricultural occupations curricula have been discussed. Perhaps it would also be beneficial to observe the relationships between independent variables and diffusion which were not significant. Independent variables which were not significantly related to diffusion included: (i) administrator's attitude toward cooperative agricultural occupations training, (2) the offering of a separate agricultural mechanics class in the vocational agriculture department, (3) the school's per pupil expenditure, (4) the number of agricultural training stations available in the community, and (5) the number of vocational programs offered by the school.

Of all the independent variables considered, the administrator's attitude toward the innovation had the least relationship (.136) with diffusion. Figure 4 reveals that, in general, administrators were highly favorable to cooperative agricultural occupations training which

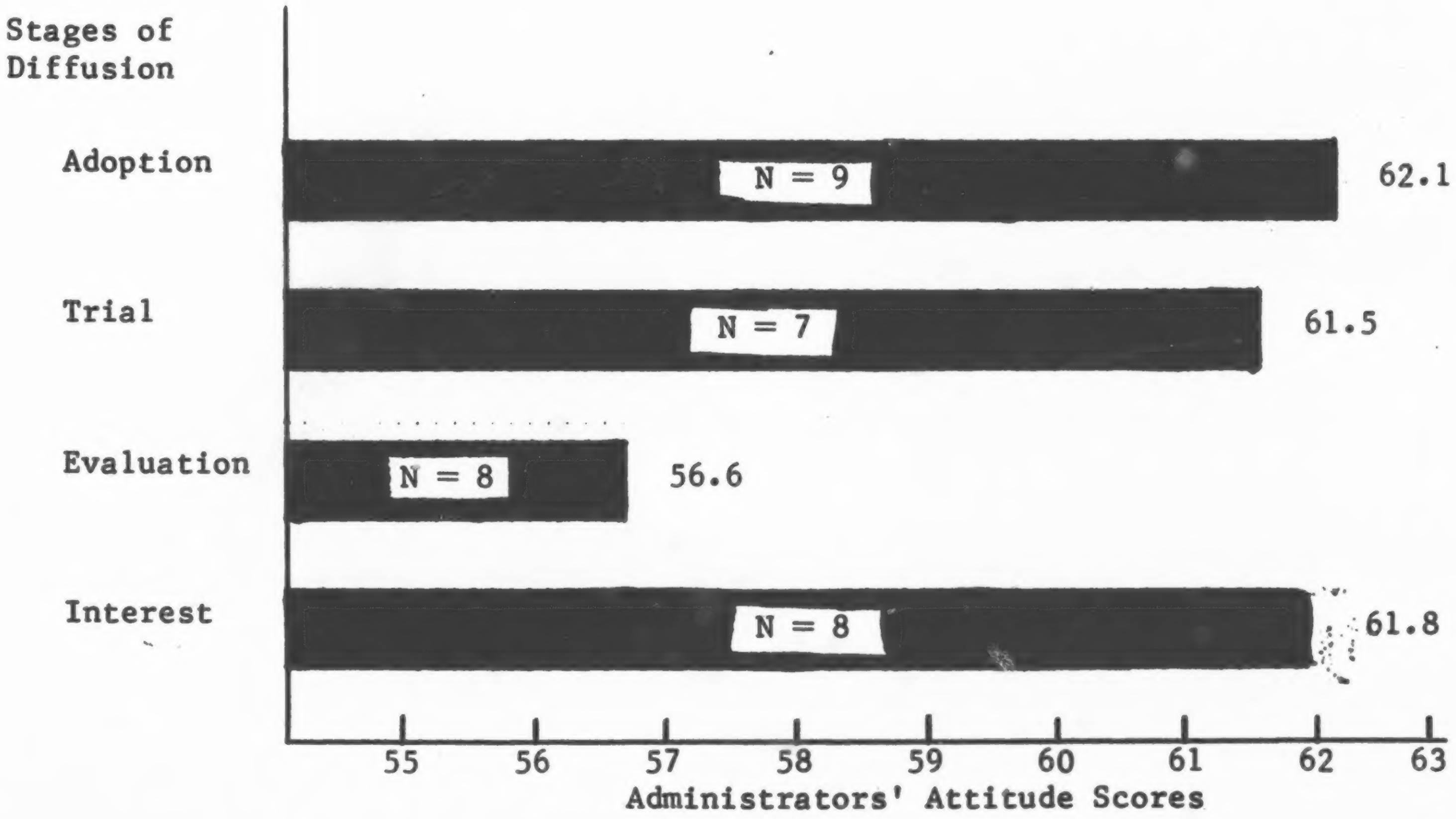

Figure 4. Administrators' Attitude Scores by Stages of Diffusion

accounts for the low relationship. The attitude scores ranged from 48 to 78 points with a possible score of 88 and a mean of 60.71.

The fact that no significant relationship existed between the offering of a separate agricultural mechanics class and diffusion can be conceptualized by the data in Table II. Of the 14 programs offering a separate agricultural mechanics class, eight were in the trial or adoption stage. However, there were also eight of the 18 programs not offering a separate class which were at the trial or adoption stage.

TABLE II

OFFERING OF SEPARATE AGRICULTURAL MECHANICS CLASS
BY STAGES OF DIFFUSION

Offer Separate Agricultural Mechanics Class	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
No	5	5	4	4
Yes	4	2	4	4

The school's per pupil expenditure was also not significantly related to diffusion of cooperative agricultural occupations curricula. This lack of relationship is easily visualized in Figure 5 which shows the mean school's per pupil expenditure for programs in the various stages of diffusion.

The range in expenditure per pupil was great--$321.12 to $676.47, with a mean of $442.07. However, when programs were divided into stages of diffusion, there was very little variation in the school's per pupil expenditure.

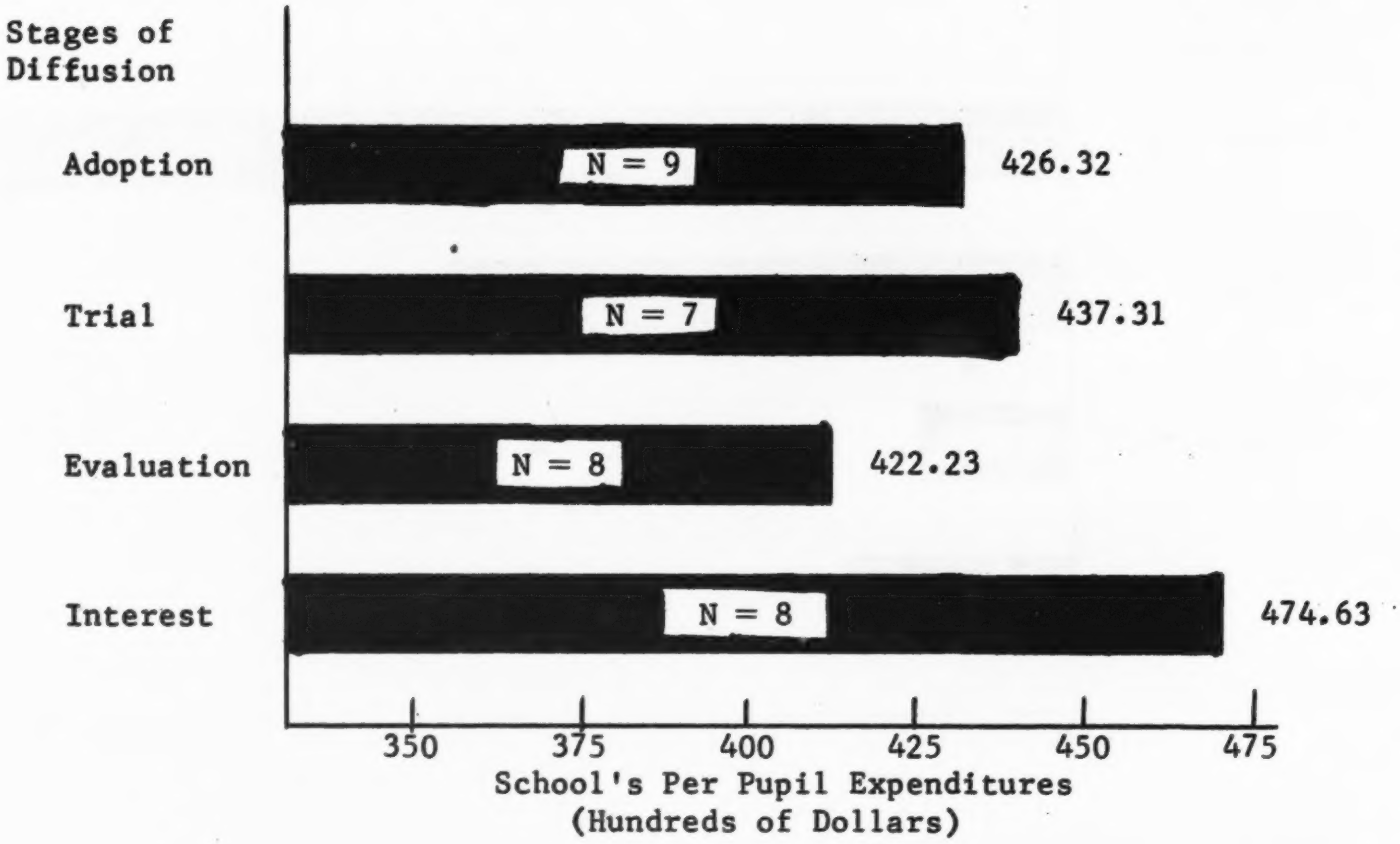

Figure 5. School's Per PupilExpenditure by Stages of Diffusion

The number of businesses in the community, as identified by the teacher of vocational agriculture as potential training stations, ranged from 2 to 28, with a mean of 13.09. Figure 6 reveals that as diffusion increases the mean number of training stations available tended to increase, with the exception of programs at the evaluation stage. However, the correlation between the number of agricultural training stations available and diffusion of the innovation was not significant at the five percent level.

The study did not reveal any significant relationship between the number of vocational programs offered by the school and diffusion of cooperative agricultural occupations curricula. Figure 7 shows very little variation in the mean number of vocational courses offered in the schools and programs at the various stages of diffusion. The number of vocational programs offered by the schools included in the study ranged from one to ten, with a mean of 3.21

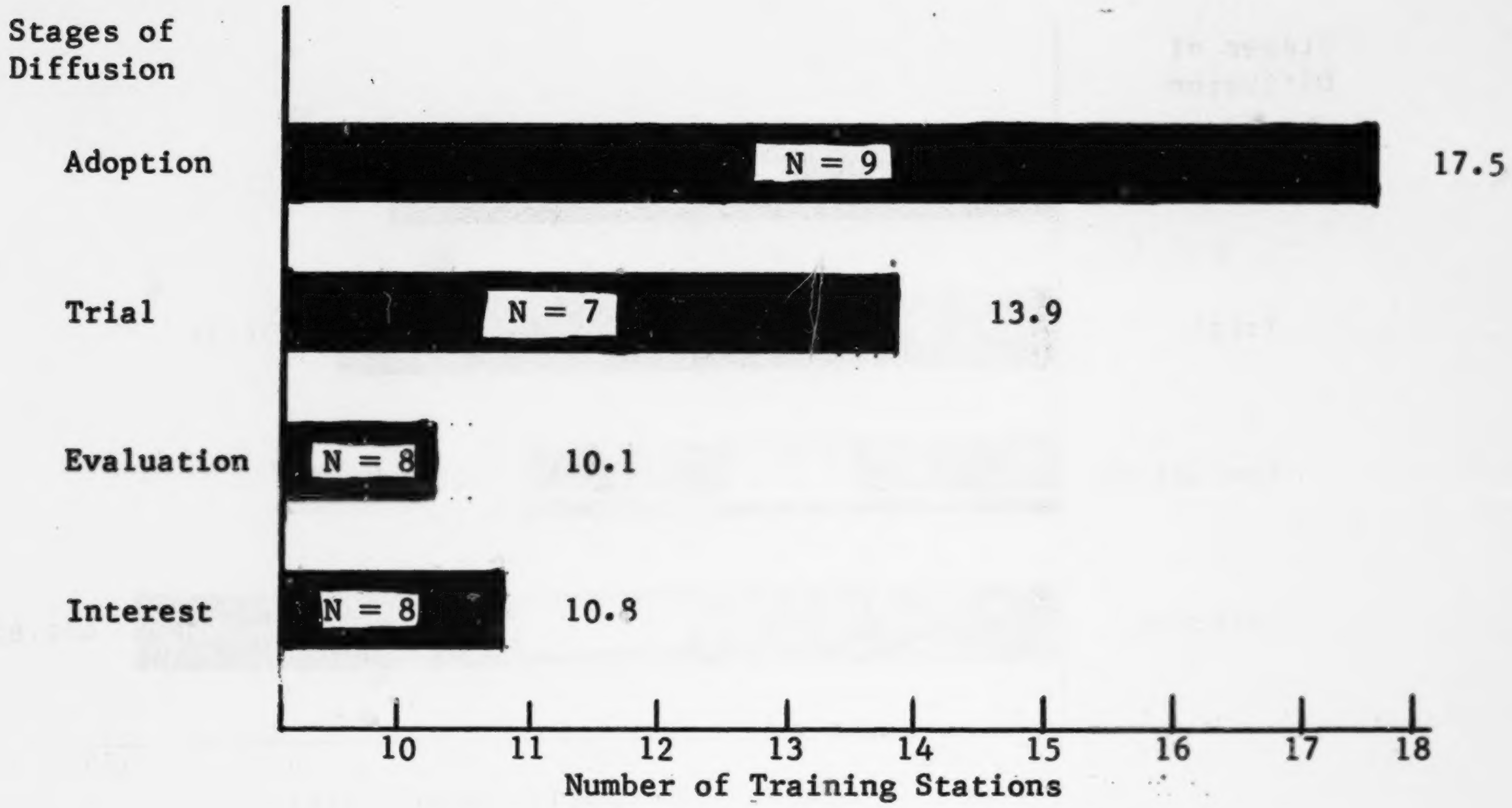

Figure 6. Number of Training Stations Available by Stages of Diffusion

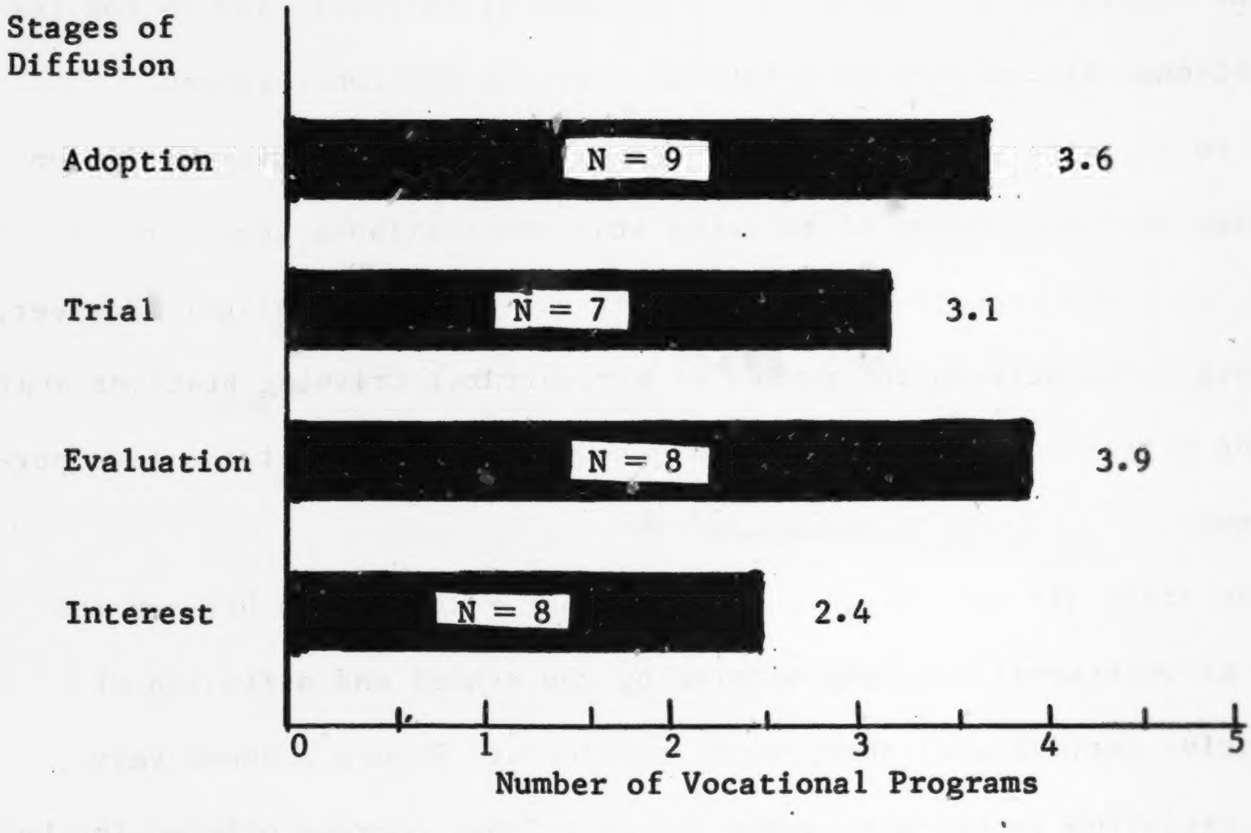

Figure 7. Number of Vocational Programs Offered by Stage of Diffusion

It is interesting to note that in seven schools agriculture was the only vocational program offered, and that none of these had adopted cooperative agriculture occupations curricula.

Up to this point attention has been directed to the relationship that existed between independent variables and diffusion of the innovation. Focus will now be placed on examining the amount of variation in diffusion accounted for by independent variables. Variation accounted for by each variable was determined using multiple regression analysis which takes into account the intercorrelation among the independent variables.

Table III shows the extent to which the variation away from the mean diffusion score was explained by the independent variables. The variables as listed accounted for 70 percent of the variation.

The number of teachers in the vocational agriculture department accounted for 36.4 percent of the variation in diffusion of the innovation. This one variable accounted for slightly more than one-half of all the variation accounted for by all nine independent variables considered in the study.

Innovativeness of the teacher claimed an additional 15.2 percent of the variation. Additional variation accounted for by other independent variables, in the order they were entered into the multiple regression equation, are: (1) offering of separate agricultural mechanics class, 3.8 percent; (2) number of non-farm students enrolled in vocational agriculture, 3.1 percent; (3) administrator's attitude toward the innovation, 5.0 percent; (4) number of students enrolled in vocational agriculture, 1.9 percent; (5) school's per pupil expenditure, 2.3 percent; and (6) number of training stations available in the community, 2.4 percent.

The number of vocational education programs offered by the school did not account for any of the variation.

TABLE III

RESULTS OF REGRESSION ANALYSIS

Order of Entry into Regression Analysis	Variable Name	Percentage of Variance Accounted for by each Variable	Cumulative Percentage of Variance Accounted for by Variables
1	Number of Teachers	36.4	36.4
2	Innovativeness of Teachers	15.2	51.6
3	Offering of Agricultural Mechanics	3.8	55.4
4	Non-farm Enrollment	3.1	58.5
5	Administrator's Attitude	5.0	63.5
6	Enrollment in Vocational Agriculture	1.9	65.4
7	Expenditures Per Pupil	2.3	67.7
8	Number of Training Stations	2.4	70.1
9	Number of Vocational Programs	0.0	70.1

Based on the findings of this study, the following conclusions emerge as being of particular importance:

1. Schools with a multiple-teacher vocational agriculture department will probably be more successful in the implementation of cooperative agricultural occupations curricula

than schools with single-teacher departments.

2. The more students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
3. The more innovative the teacher of vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
4. The more non-farm students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations training being diffused into the program.
5. The following factors do not appear to seriously inhibit the diffusion of cooperative agricultural occupations curricula: (1) administrator's attitude, (2) school's per pupil expenditure, (3) number of agricultural training stations available in the community, (4) offering of separate agricultural mechanics class, and (5) number of vocational education programs offered by the school. However, since each of these variables, except the number of vocational education programs offered by the school, accounted for additional variation in the criterion, they should be considered when predicting diffusion of cooperative agricultural occupations curricula.

Hopefully, as the findings of this study have been presented, you have been able to make implications to teacher-education and supervision. It is the opinion of the speaker that the following statements are worthy of consideration.

1. A greater number of multiple-teacher departments need to be established to effectively expand the vocational agriculture program by adding cooperative agricultural occupations curricula.
2. Schools with large enrollments in vocational agriculture, and large non-farm enrollments should be encouraged to supplement traditional agricultural production curricula with cooperative agricultural occupations training.
3. State staff personnel should consciously and deliberately identify and use the more innovative teachers to conduct pilot cooperative agricultural occupations training programs, and other purposeful changes in agricultural education.
4. State staff personnel should be more positive in their recommendations and exert greater leadership in actively promoting adoption of cooperative agricultural occupations curricula as a supplement to the total vocational agriculture program.
5. Further research relating the diffusion and adoption processes to change and innovations is needed in agricultural education to make the change process less haphazard.

AGRICULTURAL EDUCATION 1980: A LOOK INTO THE FUTURE

O. E. Thompson, University of California

The future of agricultural education has never been brighter. It will be a different kind of agricultural education from that of the forties, fifties and sixties. How bright this future is is up to us, for time may be running out in secondary education as it appears to be in higher education in certain places. We are living in an era in which technology has accelerated at a frightening rate, and in the process it has tended to lose contact with the society which created it. This is appropriately summarized by Archibald MacLesh writing in The Saturday Review, when he says, "The basic question is not where knowledge is taking us but how its path can be directed." This has very specific implications for agricultural education in the years immediately ahead.

In talking with various groups I have found much confusion about the meaning of the term, "agricultural education." Therefore I would like to suggest the following definition for your consideration. Agricultural education is the blending of the applied natural sciences of agriculture with the applied behavioral sciences of education. I see this blending being accomplished by the agricultural educator who has extensive preparation in the agricultural disciplines, and in addition, is characterized by his knowledge and understanding of the teaching-learning process. This definition becomes quite important as we look ahead.

In spite of the tremendous sociological problems which today bombard education from every angle, agricultural education finds itself in a rather enviable position for several reasons. Importantly, it deals with food essential to every member of society, and it deals in a dynamic expanding industry which has a built-in need for employees with special skills. Starting from the somewhat restricted responsibility of preparation of young men for production of food and fiber, not many years ago vocational agriculture now assumes responsibility for preparation for occupations in food processing, services to agriculture and farming, as well as programs dealing with the wise use of the resources of land, air, and water. This is quite a departure from the concept of agriculture we once held and which unfortunately, still prevails in some areas today. This concept takes agriculture into the city which may be polluting the air, which may damage crops, to the mountainside where a forester may be working with ranchers in brush removal to prevent forest fires.

Agriculture has and will continue to have an increasing demand for trained workers. It is recognized that low-skilled jobs will be replaced by those requiring a higher level of skills. Retraining will be a built-in requirement in most agricultural occupations, as it will be in most non-agricultural occupations. There is no foreseeable decrease in the need for the man with basic preparation in agriculture and who usually, in addition, has a specialization in one of the applied sciences.

I see the task ahead for agricultural education to be extremely challenging. Problems to be solved and unanswered questions will plague us at an accelerated rate. The biological and physical sciences with which we work are making excellent progress in the solutions of the technical problems of agriculture.

However, social problems in agriculture which historically have been unpopular and ignored are going to force us and others to look at the sociology of agriculture, and we will have to be more concerned with the impact of the agricultural technology upon people. The sociological costs of the movement of rural poor to the cities are now of national concern. The President's Commission on rural poverty reported that recent urban riots had their roots in rural poverty. Someone must determine if the sociological benefits of the small farm offset the economic disadvantages. Will the social unrest in the large city spread to the small rural towns? A number of our agricultural teachers say it is already there. Obviously, I see the future of vocational agriculture closely tied with sociological, as well as technological development.

Change perhaps accurately describes the future as I see it. In the process, however, let us not discard that which has been good. We must develop the ability to recognize when something is obsolete, and then have the courage to drop it or redirect it toward new objectives. We're going to creative people to organize and implement these new programs. If we have the imagination and the resources to meet new challenges, vocational agriculture will have a brilliant future. If not, it will be consumed by other fields of education.

My enthusiasm for agricultural education continues to be kindled by what is being written about agriculture in the press and in a number of books on the world food situation. I'm being further stimulated by an intensive study of agricultural education in progress in my state. We're looking at all levels of employment in agriculture so we can describe new and emerging jobs in this field. More importantly, however, we're building a master plan for education in agriculture in this State for the years ahead.

During the past month we met with the administrative advisory committee for this study. These men represent the major segments of agriculture and education in California. The future these men see for agriculture reinforces our belief that agriculture is at a turning point, and we must turn with it. These men were emphatic in telling us that no longer can agriculture be thought of in state or national terms only. The entire world picture must be considered. No longer can agriculture be thought of in mainly economic terms, as it is also essentially involved in the political and social world both nationally and internationally. They told us to make young men employable in agriculture, and they will see that they are employed. They want young men who know how to work and how to think. We've always been prepared to do this in agricultural education.

In the remainder of this presentation I deal with the projections for agriculture in the world and in the U.S. and then make some suggestions as to how agricultural educators can bring about the blending of the agricultural sciences with the behavioral sciences when each is in an extremely dynamic situation. In other words, our major job will be to determine how agricultural education can keep pace with development in the technology in agriculture and at the same time help agriculture keep pace with the changes on the social scene.

Food for the Future

You are well aware of the world food situations, but I do want to include a few statistics to emphasize several points. The world population which is expected to increase between 2.1 and 1.7 percent annually has a bearing upon agriculture. The higher rate would result in a world population increase from 3.31 billion in 1965 to 5.03 billion (52 percent) by 1985. Using the lower rate, the increase would be 4.65 billion, or a 45 percent increase. It is obvious that at least 50 percent increase in world food production will be needed during the next twenty years for population growth alone. William and Paul Paddock[1] in their book, Famine 1975, state, "The people are already here who will cause famine. Birth control techniques are for the future, they cannot affect the present millions of hungry stomachs." Paddocks concluded that, "A collision between exploding population and static agriculture is imminent." Another group led by Dr. C. Clark, a British agricultural economist, foresees no food shortage, much less famine, if the vast areas of the tropics now idle are brought into production. As you well know, this could not possibly become a reality in the next two decades. These points of view are not in conflict--both recognize that increased food supply is critical for survival. However, the solution of this problem becomes very complicated. One important factor is the disparity between area of food production and where people live. For example, North America has 4.6 percent of the world population, yet it produces 21.8 percent of the food of the world, while the Far East has 52.9 percent of the total population, yet it products only 27.8 percent of the world food. P. Simon[2] in his book, A Hungry World, states that this part of the world must increase its food production 472 percent by the year 2000 to meet the present standards which are much below those desired. With the concern of the United States for the nutrition of the peoples of the world we have an inescapable obligation to adjust our production upward to meet the demands of the world.

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[1] Paddock, W. and P., Famine 1975, Little, Brown and Co., Boston Toranto, 1967, p. 9-20.

The United States Department of Agriculture estimates that by 1980 the United States must increase crop production by 46 percent and livestock production by 41 percent. These increases assume a population in the United States of 245.3 million in 1980 and a labor force of 101 million, 97 percent of whom will be in occupations other than farming. However, experts believe that U.S. agriculture is fully capable of meeting the food demands of 1980. They expect that this increase can be accomplished with little increase in crop acres and that the 40--50 percent increase in output can be accomplished with only 10 percent increase in input.[3]

Certainly an increase of 40-50 percent in output in the next 15 years with only a 10 percent increase in input implies a continued advancement in technology, mechanization, and resource utilization. Implied also is the continuance of the substitution of capital for labor. In this period the mechanization in harvest of crops will truly come of age. In my State, there is not a major crop (with the exception of strawberries) which doesn't have a machine for mechanical harvesting on the drawing board or in the developmental stage. Five years ago few would have ventured to guess that by 1968 90 percent of the 180,000 acres of tomatoes in California would be harvested by machines which cost $30,000 each. Now electronic sensors make mechanical harvesting of asparagus and lettuce possible. The new asparagus harvestor which cuts only the mature sprouts was field tested this past season. Already, 300 machines are on order at a cost of $28,000 each. Each machine operated by a driver and one product packer can harvest 100 acres per day--a task requiring 25 laborers previously. The new problem for agriculture is what to do with these 25 laborers who are no longer needed in the asparagus fields. Machine development, operation and maintenance create many opportunities for students in agriculture.

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[2] Simon, P., A Hungry World, Covendia Publishing House, St. Louis, Missouri, 1966; pp. 37-95.

[3] Heady, Earl O., U.S. Agriculture in 1980, Center of Agricultural and Economic Development. Report No. 27, Iowa State Univ. Amer. 1966, p. 13.

No one can question the fact that progress is being made in production agriculture. As one looks at the broad spectrum for which agriculture education prepares workers, the following points are clear:

1. As agriculture assumes a broader definition, that of responsibility for the land, water, and air problems which influence aesthetic, as well as production of food and fiber, many new occupational areas emerge. Included will be those created by the 300 percent increase in the need for recreational lands envisioned by Orville Freeman, Secretary of Agriculture.
2. Demand for agricultural products will increase substantially and these must be produced without any appreciable increase

in acreage. Farm size will continue to increase, though perhaps at a slower rate than the past few decades.

3. Farming will take on more and more of the characteristics of big business. The operator-manager may lease the land from a holding company, negotiate with the union for his employees, rent the equipment, and borrow operating capital. The operators only inputs may be the making of management and operating decisions, and then he may rely heavily upon the computer for assistance in this function.
4. The need for semi-skilled and highly skilled workers and technicians with preparation in agriculture will continue to increase as the business of farming and agriculture matures.
5. There will be a continued migration of rural youth to the urban environment as the proportion of the work force in production agriculture decreases to the three percent by the year 2000.
6. Agricultural research is capable of solving current and future technical production, processing, and distribution problems in modern agriculture. Research on the solution of the social problems in agriculture has hardly begun.

Implications for Agricultural Education in the 1980's

The job of the agricultural educator of blending the applied sciences of agriculture with applied behavioral sciences will become increasingly complex, as the clash between technology and human values becomes intensified. Specific implications for vocational agriculture are numerous. Some of the following suggestions may warrant attention:

1. Initially, the only objective of vocational agriculture was preparation for a career in farming. While this will continue to be a function of vocational agriculture, more and more of the program will be preparation for specialized jobs in the agricultural complex. The traditional course structure of Agriculture I, II, III and IV is already giving way to many diverse kinds of programs. Students preparing for certain jobs in agriculture may take a four-year program. The first two years may be an introduction to agriculture with the special skill preparation concentrated in the third and fourth year. Preparation for other jobs may take as little as a few weeks or a semester. More of the instruction in agriculture may move from the classroom to the farm or into agricultural businesses.
2. The philosophy of change must permeate all vocational programs in the future. Students must be conditioned for the real world of work where technological obsolescence will be common and where some form of retraining to remain employable will be required at practically all levels of employment. In addition to expounding this philosophy of change, we must assume responsibility for providing the kinds of retraining needed for persons in agriculture.
3. It is highly probable that the present in-school organization for vocational agriculture will not be adequate to meet the new challenges. The great diversity of occupations in agriculture of the future may demand a breadth

of knowledge beyond that of the agricultural educator. The emphasis may have to shift from that of the specialty such as agriculture, to that of individualized programs, and the task of preparing for an occupation may become the responsibility of a team of vocational educators. For example, a program to prepare a person to operate an automated irrigation system may include a team of experts who have specialties in soils, hydraulics, electronics, plant nutrition and plant growth. Each specialist would participate in both the theory and practice portions of the preparation program.

4. There must be more effort to improve teaching programs in agriculture. Is sufficient attention being given to adapting agricultural subject matter to programmed instruction, learning activity packages, and other systems designed to improve the efficiency and effectiveness of teaching. With a changing clientele and an expansion of objectives traditional approaches of teaching may become obsolete.

5. Facilities for new programs will need to be flexible so preparation for various kinds of occupations can proceed simultaneously within the same class setting. This will call upon ingenuity to bring together the latest techniques in scheduling, automated teaching, individualized instruction, and differentiated staffing. While this may appear quite unrealistic due to the high cost, financial

support for education will be provided at levels undreamed of today, once the Viet Nam War is over. Now is the time to start planning.

6. If we truly believe in the value of the F.F.A. there must be experimental programs to determine how this program can be adopted for the new clientele in high school agriculture. The F.F.A. program, which has been highly successful with the traditional vocational program, has little or no appeal for the student who is enrolled in one of the short-term vocational programs which doesn't involve a supervised home practice or experience program. The students object to being identified as farmers, when the occupation for which they are preparing may have no contact with the production of crops or livestock. Furthermore, practically all the incentive programs, degrees, and awards in Future Farmers still center around productive projects.

7. Quality work experience, a long recognized part of the preparation for farming program, must be provided for all occupational education programs. Far too often work experience includes only the placing of the young man or woman on a job with the assumption that the student is learning simply because he is on a job. The recent publication on work experience by Cornell University is an excellent guide for developing work experience in agriculture which is truly educational.

8. The expansion of instruction in agriculture in the two year college and the post-secondary technical schools will continue to create many problems for the high school program not the least of which is competition for teachers. What should be the relationship between high school and post-high school education in agriculture: Should all vocational education be in post-high school programs? Do we need a fine definition of function between the two levels of programs? How can problems of articulation be mediated? We feel we have solved many of these problems in California. However, this has been a long process and problems still occur occasionally. Much of our success has been achieved through a statewide liaison committee for agriculture which meets twice a year to discuss problems of articulation. This committee includes elected representatives from agriculture in high schools, junior colleges, four year colleges, and the University.

9. Vocational agriculture must take a larger responsibility for occupational preparation for disadvantaged youth. Many of these can qualify for city jobs in the service occupations such as park maintenance, landscaping of public and private buildings, freeway landscaping, and many others which deal with plant sciences in one form or another. The vocational agriculture instructor has the technical knowledge and the know-how to prepare persons for these occupations. The clientele to be served are quite different and instruction will be challenging, but rewards will be worth the effort.

10. Vocational agriculture should play an important role in bridging the gap between technological advancement in agriculture and social change in the community. Mechanization in agriculture contributes to rural poverty in many areas through the elimination of jobs for low-skilled farm laborers. Perhaps vocational agriculture could take a more active role in preventing technological obsolescence through early identification of jobs which are on the decline and retraining of these workers before they become unemployable. Once unemployable it is extremely difficult to even get this worker into the labor force.
11. The concept of professionalism which is strongly exemplified in vocational agriculture today may be in for drastic revision. Collective bargaining and negotiated working conditions are becoming common in public education. While this has not affected any of our programs yet, we see more and more reluctance on the part of teachers to devote the long days and weekends to their jobs. I predict that in another ten years teachers will be under contracts which will specify standards for working conditions and hours, deviations from which will result in extra pay or penalty.

Implications for Teacher Education and Supervision

The traditional pattern for the preparation of teachers of agriculture which, for many years, was somewhat standard across the United States is now in transition in most states. There has been a general relaxing of previous rigid requirements of a specified undergraduate course preparation. Now in most states, practically any major in agriculture can qualify to teach agriculture with little additional course work. There has been a gradual increase in general education requirements for teachers with a resulting decrease in technical course requirements. Yet much more change must be made to meet the new demands which will be placed upon the teachers of agriculture in the next decade. Some of these are as follows:

1. The traditional requirement of competency in farming will not be adequate. The teacher must be competent in the occupation for which he is providing preparation. Work experience programs must be an integral part of teacher preparation and in-service programs for teachers.
2. Special preparation including appropriate work experience must be provided the teacher who will work with students having special needs such as the disadvantaged and the retarded.
3. Experience with new strategies of teaching must be provided. These include sensitivity training, interaction analysis, reality theory, inquiry training, transaction analysis, achievement motivation, learning activity packages, and a host of others.
4. More realistic supervised teaching experience must be provided, and this experience must be individualized. For example, all student teachers may not need to spend the same length of time in the student teaching center. Some

may need only a few days, while others may need a year-long internship.

5. The teacher must be prepared to teach both youth and adults and to provide short, intensive courses in occupational preparation, as well as the long term career type of vocational education.
6. Teacher candidates must be prepared to look objectively at all the issues in education and in society. This includes an analysis of both management and the workers biases, community power structure and pressing social issues.
7. Teacher candidates must be conditioned to change and be brought to realize that they too will need retraining periodically. By 1980, college degrees may be valid for a designated number of years with required course work for renewal.

Implications for Research

Research in the '70's will not be lacking for problems. Far too little information is available upon which to make current decisions in vocational education. I expect this will also be true in 1980, but I hope the problems are different.

The researcher must keep a watchful eye on the agricultural industry to identify emerging jobs and the preparation needed for each. He must also find how we can teach employability skills and employment skills at the same time to students who do not have a work heritage. He must provide an evaluation of the comparative effectiveness of various kinds of programs for occupational preparation. He must help us determine the economic efficiency of programs of vocational education. With the great demand for work experience perhaps the researcher could evaluate alternatives for work experience. Perhaps research on simulated work experiences devices such as the "link trainer" used in pilot training should be given top priority.

Summary

It is always different and dangerous to express one's views on the future. However, I am certain of one thing, and that is we will have constant and perhaps accelerated periods of change, and as stated by Professor Harl of Iowa State University, "If there is any equilibrium in sight, it is the equilibrium of adjustment to change."

The years ahead will be interesting, even though we won't be as comfortable as in the past. We may find by necessity that we have to accept "pot", long hair, the electric guitar, sandals, and the mini skirt. The era of delayed gratification, thrift, Puritan morality, respect for the law, acceptance of the establishment, and the work ethic may be over. Since most of us built our lives around these principles, it is only natural that we revolt at having these challenged. Progress will continue and as MacLesh has said, "The basic question is not where is knowledge taking us, but how can its path be directed." Agricultural education has a responsibility to help direct technology. In the process, agricultural education must go forward and it will thrive if we keep alert to change. I anticipate our role as educators will become much more critical than our role as agriculturists. I see a significant role for agricultural education in the alleviation of the social unrest sweeping the country. I see agricultural education playing a vital role in the prevention of world famine.. It is a great challenge, and I am confident that agricultural educators are up to "that inspiring task."

COMMENTARIES

Ira A. Dickerson, Georgia State FFA Camp Director

Mr. William's presentation could apply to Georgia. One of the most difficult tasks we have is to motivate teachers to adopt innovative practices. We have some 6 or 8 areas of specialization in our program of vocational agriculture. How should teachers be selected to receive in-service training to prepare them to teach in specialized areas? What criteria did you use in Oklahoma in selecting teachers for your institute? I believe that frequently we on the state staff see things differently from teachers; they see things in the light of their experiences. In other words, we may insist that a teacher offer an area of specialization, but the teacher neither sees the need for, nor does he have any desire to offer such a program. I think one of our biggest problems is motivating teachers to break away from the old routine and try something different.

In multiteacher departments, Mr. Williams reported the number of students per department rather than the number of students per teacher. Could we assume that the number of students per teacher in multiteacher departments is less than in single teacher departments? If this is true, the results might have been different if number of students per teacher had been used. In Georgia, we have had the feeling that some of our specialized areas have met with better success in multiteacher departments.

Robert E. Norton, University of Arkansas

It seems to me that Mr. Williams' topic was concerned with attempting to discover how can we bring about more change. Similarly, I think that promoting change was one of the objectives of the institute which was conducted prior to his study. In view of the above, I would like to briefly discuss one theory of change and the role of change agents before commenting directly on Mr. Williams' presentation.

Just as Vocational agriculture teachers are change agents attempting to change the attitudes and actions of their students, I feel we teacher educators and supervisors must also be change agents. Before many teachers will adopt new programs such as the cooperative agricultural occupations curricula discussed by Mr. Williams, we will have to fulfill our role as a change agent effectively. One might logically ask then, "How can we be effective change agents?" To answer this, we must ask ourselves another question, "Why does man change?" The change agent must know the answer to this question if he is to be effective. Man exists in and reacts to his environment. He is constantly attempting to create and maintain a satisfying adjustment between internal forces created by his inherited traits and external forces imposed by his environment. This adjustment is evidenced when a man's behavior changes in reaction to an inequilibrium with his environment. Inequilibrium produces tension and man adjusts or changes his attitudes and actions voluntarily, in order to reduce tension. "Voluntarily," needs to be emphasized because man changes only when he wants to. Sure, we can exert many pressures upon him in various ways but he will ultimately be the one to make the decision to change or not to change.

William J. Brown, North Carolina State University

Reacting to these two presentations will be a pleasure. They tie in very well with the presentation regarding the construct of change that was given this morning. Williams' study applied a theoretical model of change in a research setting. It illustrates how constructs of change can be used in problem situations.

Williams' objectives related to (1) what kinds of teacher characteristics were influential in change and (2) what kind of situations were influential in change. As I began to read his study, I wondered how one evaluates change as it takes place. For example, how much change do you have to have in order for it to be successful? He pointed out that about 16 teachers out of the 32 were either trying the practice or had adopted it. So about 50 percent actually tried the change. This seems pretty good when we think about how long it took hybrid corn to get adopted. But really how good is it? This is a change that evidentally the teachers ought to have been adopting with little resistance. It certainly wasn't like the change in behavior required of the student teachers who faced student behavior described by Dr. Thompson.

Now, let's look at the factors that really influenced change. More change was evident in a multi-teacher department? Could this be explained by the fact that a multi-teacher department has specialized teachers who are responsible for different areas one of which may have been an off-farm, agricultural occupation area? Maybe variation and adaptability are more easily implemented in a multi-teacher department.

A wise change agent, therefore, initally addresses his effort to creating unrest, inequilibrium or tension within his client so that a desired change will ease this tension. In a sense, a change agent must really be a dissatisfaction agent. He must create tension and unrest. I see the change agent's role as three-fold: First of all, the change agent must convince the client that he can improve himself by making desirable changes. In other words, we must help our client, the vocational agriculture teacher, to see the need for changed behavior. Secondly, the change agent must assist the client in identifying the desirable changes. Since change may be either good or bad, we have a responsibility to help our teachers in determining the best of alternative changes. Thirdly, the change agent must help to reduce the risk involved to the client when he is adopting an innovation. We must assure him that he will not lose his job, but possibly stand to gain more students. We should make sure that he has considered all pertinent information available, and that he has considered all the various alternatives.

I will summarize this discussion of change by saying that to bring about change, the change agent must create tension by either one or both of the following: (1) By adding to or strengthening present change incentives or (2) by decreasing change inhibitors.

Now I would like to react specifically to Mr. Williams presentation and say that I am in agreement with most of the comments he made. However, for change to take place, I would repeat that we must not only modify teachers' knowledge and skills as outlined in the first page of his paper but I think we must also change teachers' attitudes. Perhaps the best way to change these attitudes would be to produce dissatisfaction or tension which in turn will cause a change in attitudes. Let's point out to the teacher why he is out of date and how he can better meet the needs of his students by changing.

I would also like to apply the theory of change and change agents to Mr. Williams' study. The question essentially asked by the study was, "Why were teachers not equally successful in arranging their programs after receiving the same retraining?" Their success varied because of differences in three factors. The first, and perhaps the most important one, being the degree of dissatisfaction with their present program. Success varied also because of differences in the clarity of the desirable changes. Some teachers were more doubtful than others about what should be done. Some probably went home feeling that they knew exactly what should be done while others were very reluctant or hesitant about what should be done. Thirdly, their success varied because of the amount of risk actually involved or perceived to be involved. I would like to relate these variables to the four variables Williams found to be significantly related to change or adoption.

More change occurred where there were more teachers employed. Probably more change occurred in these situations because there were fewer risks or obstacles to change. Also, more teachers probably meant more students and more dissatisfaction with the present program. The second variable found to be significant was the number of students enrolled. I would venture here that the more students enrolled, the more dissatisfaction probably because of a wider diversity of student interest. Thirdly, the innovativeness of the teacher was a significantly related factor. I would suggest that the more innovative the teacher, the fewer risks he perceives. The teacher who is very conservative probably sees more risks in any change; he is hesitant to move. The fourth variable that was significantly related to adoption was the number of non-farm students enrolled in agriculture. I would say this variable is closely associated with increased dissatisfaction with the old vocational-agriculture program. The more non-farm boys a teacher has the less likely his students are to be satisfied with only the basic farm production and management type of program.

Dr. Thompson's presentation provided a lot of food for thought. It was timely. Two points stand out in my mind; the first being that we must not discard that which is good. We must develop the ability, however, to recognize that which is obsolete and then have the courage to drop it or redirect it toward new objectives. This is a difficult task but it is one that we must do. Secondly, we must be more concerned with the impact of agricultural technology on farm people. We cannot stop with the development of new machines but we must also show concern and act to help the people that these machines replace. If I had to pick a highlight in the presentation, this would be it.

I would like to add a couple of other points which are relevant to the presentation on the future of Agricultural Education. First of all, more evaluation is going to be necessary in the future. Not only does the 1963 Vocational Act call for it but administrators and surprisingly enough, teachers want evaluation of their programs.

If we don't conduct the necessary evaluation of our programs, somebody else is going to. On this topic, I commend the June issue of the Agriculture-Education Magazine to your reading.

In terms of evaluation, we need a system that is effective in at least two ways. (1) This system must provide information to make changes and improvement in our agricultural education programs, and (2) it must provide information for the public dissemination of facts and results about agricultural education. As Dr. Warmbrod's editorial in the June issue of Agriculture-Education Magazine states, "If we fail to supply the needed data and information about agriculture-education, we have no recourse but to accept not only the data collected by others but also the value judgments made by others."

The other point that I would like to mention in terms of what I see in the future is that of increased interaction and cooperation with other vocational teachers. I feel we can expect more team teaching, more cooperative programs, joint research efforts, and closer coordination among vocational teachers and vocational programs. This closer working relationship may cause us to lose some of our identity as agriculture educators. Some of us may be concerned about this. Personally, I am not too concerned. In the future we may be identified as vocational educators perhaps even as occupational educators rather than as strictly agriculture educators. I feel most teachers will work with students in more than one vocational area.

WILLIAMS--First of all, I should clarify that only 32 teachers were included in the study. They were the Oklahoma institute participants who were still teaching in the same school as they were when enrolled in the institute. It is interesting to note that two of the Oklahoma institute participants moved to positions of teacher educators in agriculture. One became a district supervisor of vocational agriculture. Therefore, some of the talent that escaped the local programs was salvaged and utilized in a broader capacity.

In answer to the question: What was actually involved in the institute? Basically, the institute attempted to introduce instruction in agricultural distribution into the vocational agriculture target system. Emphasis was placed on using agricultural businesses in the community as training stations to provide on-the-job training for students. In addition, attention was given to developing teaching materials for classroom use.

Another question was: How were teachers selected to participate in the institute? The teachers made applications to participate. Their application exemplified an interest in cooperative agriculture occupations training. Participants were selected on the basis of need for this type of program in their local communities. Teachers in departments located in or near metropolitan areas where production agriculture was limited and where a number of agricultural businesses existed received preference.

BROWN--After the institute was over, did the teachers receive any special supervisory help or encouragement?

WILLIAMS--In addition to the regular supervision from the state department, the institute staff visited the teachers during the school year.

BROWN--Did you get a sense of the problems the teachers were having in adopting the innovations that were not recorded in this paper?

WILLIAMS--I think most of the teachers felt a need to include cooperative agricultural occupations curricula in their programs. Tension and anxiety appeared to be present. However, there appeared to be something inhibiting this change in many instances. I think this was the risk factor mentioned by Dr. Norton. Most of the teachers had been successful with traditional programs and many hesitated to introduce new ideas not knowing what reactions would be generated in their communities. Some successful teachers utilized other people in the community, such as an advisory committee, to help plan the new program and to share the risk of adopting the innovation. A few teachers involved administrators and businessmen who provided training stations in planning the occupational training program.

Some literature related that administrators are sometimes responsible for actually obstructing change in education. However, this did not appear to be the case with cooperative agricultural occupations curricula in Oklahoma. This study revealed that administrators in most instances were highly favorable to the innovation.

EDINGTON--Dave, I happened to be here for a few weeks at this institute, and it wasn't easy for these teachers to change. They put forth a lot of effort.

BAKER--Before we move to Dr. Thompson's presentation, I would like to comment on this teaching area. A study similar to this one being reported has recently been completed in the state of Alabama. Out of 367 teachers, 70 percent of the questionnaires were returned. A lot of this was by accident. I found it amazing to look at differences between the teachers who have this kind of program and those who do not. The years of tenure that they have in a department may make a difference. The years of work experience they have had other than teaching may make a difference. You say that the other vocational programs offered by schools did not make a difference. I think in the long run it will. I said this information was somewhat accidental. I don't have a doctoral committee breathing down my neck. It is hard for me to believe the number of training places a teacher has within a community makes no difference. I believe the criteria for selecting teachers for this particular institute included provision for a sufficient number of training stations.

WILLIAMS--Yes, institute participants were selected on the basis of an opportunity for the program in their community.

TOWNE--Mr. Williams, I have the idea that three of the four factors you presented are really one and the same: multiple teacher department, the number of students, and the number of non-farm students.

WILLIAMS--This was brought out in the multiple regression analysis. The multiple teacher department was the first factor which counted for 30 percent of the variation. These variables are closely related to one another.

THOMPSON--(In response to an audience question) In our department, we have been studying migrant labor and working conditions for three years. Last year four people from the department were working in the migrant streams. We had a husband and wife working as migrants. We had two fellows working in day haul on our staff studying the working conditions and how these people were treated by the employers. Society knows about migrant problems. These people have a voice.

At our commencement exercise this year, we had a display picketed by groups of students who were condemning the university for its lack of concern for the disadvantaged workers. Our dean has a campus committee looking at what the College of Agriculture can do in this area. We are going to be much more in the limelight than any other state. But rural poverty is in every state. It is in every rural community. But what have we done about it? Can we do more about it? I think we may have something to give to these people.

When you had a good future farmer you rode him to the end. He was in front all the time. Probably a lot of boys down at the bottom you didn't see very much. But you saw the good ones. Maybe we need to redirect our attention to those who need our help. I keep thinking of the 4-H club motto: To make the best better. I sometimes think we try to capitalize that phase in the future farmers. We take the best boys and try to make them a little bit better and forget about those down at the other end. We can't go on in society ignoring these people; it would be a bit more comfortable to continue as we are but people are going to call this neglect to our attention. So my concern is the sociological aspect of this. And this is a research focus which we have had in our department for three years.

AUDIENCE QUESTION--Would you mind giving further explanation on your projection that unemployment may become not a hardship but rather an objective.

THOMPSON--Unemployment may become an objective. We have some things built into society today which prohibits work. I will give you an example. We have a man in Sacramento County with ten children. If he takes a job, he loses money. His welfare payments are much more than he can make at his skill level. Right now we have 50 women being trained to work on tomato harvesters. They are on welfare. They have dependent children. These women have to get up at 5:30 in the morning and take their children to babysitters at 5:30 in the morning. This means they have to get up about 4:30 because they have to be on the job at 6 and these children stay with babysitters all day for 10 hours. What incentive is there for this person to work? They are receiving less than desirable but a median wage on welfare when they are not working. It is pretty much of a hardship for a woman to meet this schedule when work is forced on her. She earns $16.50 a day. When she gets home at 5:00 p.m. she still has those children to care for. They have been with the babysitter all day and she has to get up at 5:00 a.m. the next morning to go back on the harvester. In this case, unemployment may be an objective. The benefits of employment are less than other benefits.

TOWNE--Well, that is the negative attitude: one usually associates with the welfare recipient as being a loafer. Actually only seven percent of our welfare recipients are capable of handling a job. The rest are children or disabled adults. But I think there is a more positive attitude toward unemployment. We have accepted the fact that 10 percent of the people produce goods. In industry we may reach the point where only 10 percent of our people are in productive work; in other words, it is unemployment. These are different kinds of employment: the crafts, the arts, etc. Work and leisure are not two opposites but different points on the same scale.

THOMPSON--We need a new concept of work. Maybe going to school is work; maybe society is going to pay me to go to school and consider this work. Maybe we need to start a new concept of work. What is work? We always think of it in terms of tangible product; sometimes it is an invisible product.

MEISNER--A very interesting study has come out of New York where social pathology has been measured among people who have been considered to be marginally employed compared to the unemployed. Those who held jobs were better adjusted as contrasted to those that were unemployed. So there may be virtue in being employed.

Research Trends

REGIONAL AND NATIONAL RESEARCH ACTIVITIES

Harold A. Haswell, USOE, Region VII, Dallas, Texas

Since the assignment was to look at national priorities in educational research--particularly those affecting agriculture--as well as the regional priorities, I start first with that part of the problem with which I am least familiar, the national scene. Before we do so, I think we might profitably spend a few minutes looking at some of the practical results of research.

What kind of a price tag would you put on a metal bearing that would not wear out? Well, one has been developed. The Lewis Research Center has put together a new alloy with an hexagonal crystal structure that is virtually unwearable. You can see infinite uses for such devices. Such bearings are already finding their way into automobiles, appliances in the kitchen and home, and various industrial uses. Since it is a noncorrosible material, one of the unusual uses for the new alloy is the manufacture of artificial joints for elbows, hips, and knees.

Another instance of applied research, drawn from literally hundreds that I reviewed, utilizes infra red imagery in establishing acreage control and priority payments. I was amazed to discover that high flying aircraft or orbiting space craft can determine crop species and varieties more accurately than observable measurement on the ground. Scientists are now able to determine the species and variety of crops, the relative size of fields, the stage of maturity of the crop, the type of soil, the moisture content of the soil and even dead or diseased portions of a forest may be determined more accurately by using infra-red imagery films than one could using standard color photography at ground level.

Most Federal agencies are involved in one way or another in agricultural research. Another interesting question emerged from the literature I reviewed. How can the Nimbus weather satellite help the deep sea fishermen? For some time this object has been circling the earth every 90 minutes. In minutes the entire North Atlantic Gulf stream can be photographically mapped more accurately than a huge fleet of ships and planes could do it in ten days. Furthermore, by the time the fleet of ships and planes had completed their job, the map could not accurately reflect the currents because they would have changed. With Nimbus, a new map is made every day. The deep sea fishermen now have a daily map of the whole Atlantic Ocean. If the fishermen know where the stream is, they know where the fish are because the fish follow it.

The relative importance of research in the field of agriculture is obvious to all of us. The population of the earth is expanding at astronomical figures. The estimated population of the world by 2000 A.D. is fixed now at roughly 6.2 billion people which is virtually double what it is right now. In thirty years, we will have twice as many mouths to feed. This means that the areable lands which had a ratio of 1.25 to every human being on the earth in 1955 will shrink to one-half acre per person by 2000 A.D. The demand for more food and fiber is imperative. It is up to research, as it has always been, to blaze the way.

As agriculturists you have set an envious record in the field of research. I doubt that there is a more dramatic demonstration of what research can do for our society than the research record established by American agriculturalists stretching now over a full century.

Let's take a look at the Federal funds available for research and development. The outlook is bleak at present. Until the Vietnam war is over, in my opinion, the picture is not going to get any better. The research and development obligations of all Federal departments in 1967 were fixed at 15.3 billion dollars. This does not include the investment from the private sector of our economy. It is estimated that the funds available will increase little more than one billion dollars in 1968 to something like 16.7 billion. Basic research is the smallest component of this figure. It has risen from 1.8 billion in 1966 to an estimated 2.3 billion. It is interesting to note that the ratio of increase is greater for basic research than for either of the components. I think this may indicate a trend that should be considered by those of you who are interested in getting at the Federal funds. It seems to be saying to you that your chances are better if your interest or your problems lie in the area of basic rather than applied research.

Applied research accounts for roughly one-fourth of that 16 billion dollars, or about four billion. I receive far more proposals in the field of applied than in the field of basic research. In fact, almost a hundred percent of the proposals I look at are either for applied or developmental activities. In applied research, the actual figure for all departments was 3.5 billion in 1966. This is expected to rise to 4.1 billion in 1968.

Most of the Federal money, however, does not go for basic or applied research, but rather for developmental activities. A fairly constant figure over the past three years has been set aside for the support of such activities. That figure is roughly 10 billion dollars a year. This is the area which largely accounts for the increase of funds going into Federal research.

The major agencies of the Federal government that are supporting research are the following. Eighty-five percent of all of the money in 1967 was provided by four departments: (1) Department of Defense accounted for 33 percent; (2) NASA has 26 percent of the national funds; (3) HEW came in third with 20 percent of the Federal funds and (4) the Atomic Energy Commission was fourth with 7 percent. The Department of Agriculture obligated 255 million dollars or five percent of its entire operational budget for research in 1967. USDA was well down the line in the level of major departments supporting research.

Who performs the research makes an interesting inquiry. Industrial firms received 61 percent of all the money. Government operated research installations accounted for the second largest block, or 21 percent of the money. Colleges and universities came in third. Eighty-two percent of all the money available through the Federal Government went to industrial firms or government operated research installations manned by people employed by the Government. Colleges and universities received only nine percent of the 16 billion dollars directly. An additional four percent went to Federal contract research centers administered by educational institutions. If you put the two together, the colleges and universities received 13 percent of the total Federal funds going into research in the past three years. The remaining five percent went to non-profit institutions and agencies involved in research.

What was the money spent for? This is a high priority question. Almost three-fourths of it, 68 percent, supported basic and applied research in the physical sciences. If one wanted to tap federal funds, the best chances are in the physical sciences. The health and life sciences accounted for another one-fourth of the money. When you combine the two (and agriculture is concerned with both of these areas) you have 93 percent of the funds. Another five percent went into social and psychological research. So, you would be advised to stay out of that area if you really are going for the big money. However, if your interests are in that area, you had better be quite sophisticated and write excellent proposals because little of the money is finding its way into social and psychological research.

One interesting trend was observable. The fastest growing research area to receive federal support is the psychological and social research. So perhaps I shouldn't discourage you too much because it is evident that more and more people are becoming interested in the social and psychological implications of human relations and the problems that relate to people. I am convinced personally that unless we solve these human problems, there will be no reason to solve the physical and life problems because there will be no one left to solve them. One five-minute atomic conflict could wipe out half the world's population easily unless we solve some of the crucial social and psychological problems that face us today. So I should not decry research in the social-psychological area.

Let me read just a paragraph of a letter from the Director of Research in the Department of Defense. Then I shall highlight some of the things he had to say. "From the Army's point of view," he writes, "basic research is selectively supported on a mission interest basis to the degree that it is possible to foresee. The future priorities in basic research are not rank ordered." (You will hear this phrase repeated over and over again. It applies to our program in HEW. You will hear it repeatedly from other departments. So don't ask for rank order priorities. They just aren't normally a part of federal programs.) The writer continues, "However, (and nearly all of us will say the same thing) the Army has operational problems which it would like to have solved and here are some suggestions if you want them." If you want to do some research and get at some of the monies that are available under the Department of Defense, the first priority they mention is hardware solutions. Agriculture can contribute to some of the hardware problems of the Army. There is no professional group that knows soil and terrain any better than you folk do unless it is the geologist. Secondly, he suggests that operational problems carry over into guidance and training. I think that you have much to offer here. Personnel selection is the third priority, and fourth, the revision of doctrine. Now, that one stumped me. I don't know exactly what he was talking about. Finally, the Army pursues basic research programs which, hopefully, will advance fundamental knowledge of the area of sciences not pursued by others. (I could express the hope that all federal agencies have this as their basic objectives.)

Now the writer comments on the trend in level of funding research by the Army. Quickly let me summarize. He says that the 1968 dollar volume will be at the same level that it was in 1964. Even though the Army has the same dollar volume in 1968, the purchasing power of the dollar will support only 73 percent as much research as it did in 1964. Contract and grant research in many instances have had to be closed down because of this shrinkage of the dollar. They have changed their policy in Army research. Previously when they had a period of austerity, they would merely fund all of the projects at a lower level. Currently the Army is shutting down many operations completely and funding only high priority projects at a level which would permit them to do an acceptable job. The brightest spot in the Army's research program we are told is THEMIS, which is a project of the Army to develop centers of excellence, thus increasing the number of academic institutions capable of performing high quality research. If any of you are interested in developing such a center, the Army might be receptive to your proposal.

Let me quickly summarize two basic areas of interest to agriculturalists supported by the Atomic Energy Commission. One is research in life and environmental sciences. The second is research in the physical sciences. Of the 90 million dollars AEC puts into the life and environmental sciences, 31 million went to colleges and universities. The rest of it went to industries, private agencies and AEC's own in-house research activity. In the area of the physical sciences, colleges and universities can compete for 60 million dollars this coming year through the Atomic Energy Commission. AEC does list areas of high priority.

If you are interested in research in biology, medicine, the life sciences, here are some of the things the Atomic Energy Commission is interested in: Somatic effects of radiation; radiation genetics; combining detrimental effects of radiation; molecular and selecular level studies; environmental radiation studies; radiological and health physics and instrumentation; chemical toxicity; nuclear energy weapons; cancer research; and finally, radiation preservatives for food. Now, the latter, it seems to me, is a natural for those of you in the agricultural sciences. My correspondent went on to say that most of the agricultural effort is in the area of the rate of radioactive materials in soil and the effects of radiation upon plant and soil-plant relations.

If you are interested in research in the area of high, medium, and low energy physics, the Atomic Energy Commission is your best source of support. This is their primary concern. They also support other physical sciences, math and computer research. There is almost six million dollars available through the Atomic Energy Commission for mathematics and computer research alone. For chemical research there is another 56 million dollars available.

When I contacted the National Science Foundation, a letter came from the Associate Director for Research, emphasizing their support of basic research. Congress is about to expand their legislative mandate which will allow them to get into the field of applied research. But up to this date, all of their monies have gone to support basic research. They have no priorities. Since its modest start in the fiscal year of 1951, NSF has given top priority to scientific research in colleges and univeristies. Ninety-five percent of their funds go to colleges and universities. This is the only agency that has such a high level of support for academic research. NSF dollars go predominantly to projects contributing directly to the training of new scientists. They are more interested than any other federal agency in supporting scientific training programs. So if this is your field of interest, remember the National Science Foundation. In general, they do not assign priorities to the different fields of science. They support superior research in all fields. Proposals are judged on the basis of their scientific merit and their significance in solving some important aspect of a practical problem.

The total money spent for agricultural research in 1967 was 123 million dollars by all departments of the Federal Government. The largest block of agricultural research funds came from the Department of Agriculture and amounted to 114 million dollars. The Department of Defense obligated 280 thousand dollars for agricultural research; the Department of Interior, 1,644,000 dollars; and the Department of State, 4,267,000 dollars. The Agency of International Development administered this last amount and most of that research was done overseas. The Atomic Energy Commission spend 2,102,000 dollars in agricultural research; the Office of Science and Technology, which is in the executive arm of the President, put 59,000 dollars into agricultural research; and the Tennessee Valley Authority contributed 1,015,000 dollars to agricultural research last year.

Now let us take a look at my own program in the U. S. Office of Education. There are nine offices such as mine in Dallas. We are called Directors of Regional Research. We need an adjective in the title, Regional Educational Research. We cannot support basic research. We can support applied and developmental activities; but they must relate to educational situations. I ask three questions about any problem to see if it fits the program criteria. (1) Is the problem in the area of the administration of an educational program? For example, if it is about the administration of a lunch program in an elementary school or the administration of a vocational or technical education program, it qualifies. (2) Does the problem relate to the teaching of any discipline? Notice the words, "any discipline." We can fund a research project about the teaching of agriculture, or chemistry, or any discipline. (3) Does the problem relate to the learning of any discipline? If your answer is positive to any of those questions, you are on target.

The grants are limited to $10,000. The time duration is 18 months. We have no priorities. We do not intend, at least not in Region VII, to establish priorities. There are few places in the Federal Government where money is available for the guy with an idea. We want to reserve our money, and it is limited in this Region, for significant, innovative, small scale research projects that will have a general impact on the educational community.

Let me review the past three-year funding pattern. In the last half of 1967, we obligated 100,000 dollars. This amount was raised to 175 thousand in 1968, and we spend 174 thousand dollars. In 1969 we are in the budget for 250,000, maybe 310,000, and it looks good; however, the bill is still in the House Appropriations Committee. We will do well if we come out with two-thirds of that amount in this Region. Actually all I have at the present time is 32,000 dollars that I can commit to projects. We carried into this year 65,000 dollars worth of unfunded projects that were approved. These projects have the first priority unless I can talk some of these investigators out of their commitment. I think I can because in some instances, they are doctoral dissertations and are locked into a specific time schedule. Doctoral research is one of the characteristics of this program. We can fund dissertation research for graduate students or college faculty. We can put you on a part-time teaching load and pick up a fraction of your salary as a part of the research budget. We can pay your statistical expenses, computer time, secretarial assistants, and research assistants; we can pay for a limited amount of transportation, test materials, and other needed supplies. We are looking for problems of real significance. We evaluate proposals on their innovativeness. We do not have enough money to duplicate research. Don't ask us to support a project similar to one completed in your neighbor's state. We cannot support implementation which is another aspect of duplication.

Share your best idea with us. Perhaps we can fund it.

FUNCTIONS OF ERIC CLEARINGHOUSE ON RURAL EDUCATION AND SMALL SCHOOLS

Everett D. Edington, New Mexico State University

The ERIC Clearinghouse on Rural Education and Small Schools (ERIC/CRESS) was one of the 12 original clearinghouses established by the U. S. Office of Education. There are now 19 of these clearinghouses with the last being Teacher Education at NCATE in Washington, D. C.

One of the primary purposes of ERIC is to retrieve, index, and make available educational information. This is accomplished by providing both hard copy and microfiche copies.

As documents are received in the clearinghouse they are selected for appropriateness and then abstracted. Each abstract contains an average of 200 words. At present the abstracts are put on a paper tape with a flexowriter. This tape is sent to the Autonetics Division of North America Aviation for processing into Research in Education. National Cash Register then prepares microfiche from the documents.

Although a great many of the problems have been ironed out of the system by this time, the greatest left is that of user acceptance. At present there are only 175 standing orders for the complete sets of microfiche with 85 of these in Institutions of Higher Education, 8 in state agencies, and 15 in local school units.

Functions of ERIC/CRESS

The ERIC Clearinghouse for Rural Education and Small Schools has the responsibility of collecting and processing information on Rural Education, Rural Compensatory Education, Migrant Education, and Education for Mexican Americans and Indians. The clearinghouse is located on the campus of New Mexico State University at Las Cruces, New Mexico.

Rural Education is broad and serves a great many different types of persons throughout the nation. The majority of them however have some relationship to the agricultural industry. We are not only interested in the formal programs conducted in the schools, but also those which are carried on by other institutions in the rural communities.

Rural schools are not only the one room school houses. Many of them are large consolidated units with fairly large numbers of students. It is difficult to give an exact number where a school will no longer be considered small. In California a high school with ADA of 500 may be considered small while in New Mexico this would not be the case. Schools in rural areas are not always "behind the times" as many persons believe. Some of the leading innovations in education are in the rural areas.

The education of migrants is a problem that will be with us for some time. Very few states are exempt from this responsibility. Texas alone has over 85 thousand of these youngsters who have that state for their home base. At least 44 states qualify for migrant education money from USOE. This is an agricultural problem as these people are nearly all working in the agricultural industry. There are social as well as educational problems which must be solved.

We have heard little concerning the Mexican American minority until recently. Many of these people have language problems which make it difficult for them to succeed in our schools. There are large numbers of Spanish speaking people in both our urban and rural areas throughout much of the Country.

A segment of our population which, by some standards, are nearly 100% disadvantaged is the American Indian. With large numbers in the Southwest but again spilled throughout the nation, here is a group of Americans who have not advanced educationally as has the rest of the nation. We are beginning to see educational programs for all ages beginning to emerge. They too have a wide range of problems which must be solved if they are to find their place in modern America. Nearly all of the youth now have the opportunity for education and more are going on to high school than ever before. They have a proud heritage which must not be allowed to disappear.

Outdoor education is beginning to emerge primarily under the leadership of persons in Physical Education. Schools, especially in the urban areas, are beginning to use the outdoors as a learning laboratory. There is a real need for more education in the use of leisure time and agricultural educators could play a leading role in this venture.

In the past few years rural education has taken a back seat to the problems of our large city schools. We need to realize, however, that a great many of our city problems are caused by persons who were educated in the country.

Agricultural education has a vital role to play in the education of the rural child. The technical advancements have far outdistanced those of the behavorial sciences.

RCU DISCRETIONARY AWARD PROGRAM

Bill Stevenson, Oklahoma State University

In the spring of 1965, the U.S. Office of Education indicated a willingness to fund Research Coordinating Units in each of the states. Twenty-four RCU's were funded from 4(c) funds for the purpose of coordinating the research in vocational education in the respective states. Twenty additional units have been funded since that time. Stated generally the objectives of the Research Coordinating Units are: (1) to coordinate intrastate vocational-technical research, and to cooperate with other Research Coordinating Units in the coordination of interstate vocational research; (2) to provide assistance to researchers in vocational-technical education in the areas of research design and methodology, review of proposals, identification of problems, and identification of funding agencies; (3) to stimulate activities which will result in increased interest and improved competence in vocational research; (4) to develop and conduct exploratory research in vocational-technical education; (5) to develop procedures whereby relevant research findings may be disseminated to those individuals in vocational education who have need of such information, and to stimulate the use of research results toward the development of innovative practices in the improvement of vocational-technical programs in local schools.

The RCU Discretionary Award Program is available to the twenty-four original Units for Fiscal Year 1969. This program ($20,000) to each state for the first year is for the express purpose of implementing research findings in local school programs. Following is a summary of how selected states plan to use the Discretionary Award Program.

State No. 1:

Not for:
1. Increased staff.
2. Routine Data Collection
3. Replace small grant awards program.

Purpose:
1. Small grants to graduate students doing research in vocational-technical education.
2. Direct grants to researchers in colleges and universities, business, and industry.
3. Stipend for workshops.
4. Travel and per diem for persons asked to visit RCU--researchers, consultants, out-of-state advisors.
5. Review and synthesis of research.

Procedure:
1. Suggestions of state advisory committee and university personnel.
2. Clearance by U.S.O.E. project officer for "other" uses.

Benefits:
1. Immediate assurance of financial support.
2. Generate research activities.

State No. 2:

Purpose:
1. Pilot programs to develop workable solutions to current problems.
2. Demonstrate feasibility of solutions to current problems.

Procedure:
1. Administered through RCU.
2. Cooperation and consultation of State Director of Vocational education and staff.
3. Request educational agencies to submit proposals for experimental, developmental and pilot programs.

Benefits:
1. Show immediate results.
2. Broad visibility and appeal.

State No. 3:

Purpose:

1. Stipends to graduate students and faculty for research.
2. Special institutes.
3. Seed money for designing larger projects.
4. Developing data processing techniques.

Procedure:

1. Research council develop list of vocational research projects suited to graduate and post-doctoral research.
2. Coordinated to lead to significant research results.
3. Visits by RCU staff to colleges and universities, junior colleges, and high schools.

Benefits:

1. Develop new ideas and concepts in vocational-technical education.
2. Solve special problems of vocational-technical education in the state.

State No. 4:

Not for:

1. Routine data collection.
2. Increased staff.

Purpose:

1. Provide means for dissemination and implementation of research findings.
2. Support action research of personnel in individual school districts, community colleges and vocational-technical institutes.

Procedure:

1. Administered by RCU director and State Director of Vocational-Technical Education and staff.
2. Request educational agencies to submit proposals for experimental, developmental and pilot projects.
3. Selected on the basis of anticipated contribution to solution of current problems.

Benefits:

1. Workable solutions to current problems.
2. Research training of local school personnel.

State No. 5:

Purpose:

1. Assist children of ghettos obtain guidance, encouragement, and employment skills.
2. Assist vocational-technical education teachers to utilize, implement and discover new ways of teaching.
3. Funds for teachers for small projects ($100. to $500.) to implement, report or discover an idea or concept.

Procedure:

1. Review and approval by advisory group.
2. Hold "drive-in" sessions in all areas of the state.
3. Bring innovators and early adopters together with other teachers.

4. Identify and reward "Innovative Teacher of the Year" in four occupational areas.

Benefits: 1. Constructive change at the local school level.

State No. 6:

Purpose: 1. Significant, meaningful dissemination program for specific audiences in the state.
2. Sponsor three-day intensive research review workshops.

Procedure: 1. Commission development of comprehensive surveys of research aimed at specific audiences.
2. Invite selected supervisory, administrative and teacher education personnel for intensive training in review and interpretation of research.

Benefits: 1. Keep education personnel up-to-date on research.
2. Publication of research reviews.

State No. 7:

Purpose: 1. Support research by vocational educators and their colleagues at all levels.
2. Seminars and site visits.
3. Conferences to acquaint local education personnel on new projects.
4. In-service training of local school personnel.

Procedure: 1. Proposals submitted to office of state director.
2. Proposals reviewed by Research Coordinating Council and recommendations made.
3. Approved proposals translated into projects.
4. Projects evaluated by RCU and recommended to Coordinating Council.
5. Projects recommended to State Director for final approval and funding.

Benefits: 1. Narrow time lag between research findings and implementation.
2. Training in research utilization.
3. Program redirection.

State No. 8:

Purpose: 1. Identify innovative projects.
2. Fund innovative projects.

Procedure: 1. Contact with vocational-education state supervisors, area school supervisors, local school staffs, teacher education and guidance personnel.

2. Suggested innovative projects reviewed by RCU staff and submitted to state commission of research, demonstration and experimental programs.
3. Selection and funding of innovative projects by RCU director and State Director of Vocational-Technical Education.

State No. 9:

Purpose:
1. Assist individuals and educational agencies in research, demonstration, pilot, experimental, and field testing projects.
2. Projects related to vocational-technical education.

Procedure:
1. Proposals submitted to State Director of Vocational-Technical Education.
2. Proposals reviewed by committee from RCU, program planning, State Director and other specialists.
3. Matching funds required in cases of institutional sponsorship.

Benefits:
1. Stimulate research.
2. Financial assistance.

State No. 10:

Purpose:
1. Conduct and evaluate pilot programs based upon research from other states.
2. Support local teachers and administrators to expand and deepen research activities.
3. Conduct workshop on pilot programs.
4. Support visits by teachers to innovative programs in their area of interest.

State No. 11:

Purpose:
1. Exemplary program be initiated in local school districts that would include:
    a. Pre-vocational education
    b. Exploratory vocational education
    c. Secondary vocational education

State No. 12:

Purpose:
1. To encourage and achieve change in local schools for the improvement of vocational-technical education.
2. To (i) identify (ii) evaluate and (iii) disseminate new and innovative procedures.

Procedure:
1. Personnel of State Department of Vocational-Technical Education, RCU, and teacher education departments asked to identify innovative practices and ideas which should be adopted.
2. Evaluation of identified innovative practices through feedback from students, achievement scores, employer reactions and teacher judgments.
3. Support teacher of innovative program through summer contract, secretarial or teaching assistant or supplies and materials.
4. Dissemination and adoption of approved practices through teacher work-shops, development of teaching materials, and onsite visits.

Other strategies will undoubtedly be developed as the projects proceed. These strategies will be incorporated into the program as it develops, if in the judgment of the RCU staff and others, their inclusion seems warranted.

Certain precautions seem to be appropriate at this point. The practice must be innovative. We should avoid simply identifying those teachers who are doing the accepted but doing it better. We should attempt to make the dissemination phase contain information which other teachers may actually put into practice in their classrooms rather than self improvement materials which will increase the teacher's knowledge but may not result in change in the classroom. Our main criteria should be: Is the practice new? Is the practice beneficial to student learning? Can the practice be adopted by other teachers in the division or in other divisions of vocational-technical education?

ACTIVITIES OF THE RCU FOR EFFECTIVE IMPLEMENTATION OF CHANGE IN AGRICULTURAL EDUCATION

Richard A. Baker, Auburn University

The overall theme of this conference seems entirely appropriate in this age of increased educational funds, a booming economy and a rapidly changing technology. During the course of this conference, we have considered:

1. "A Theoretical Construct for Change,"
2. "A Change Construct and its Application,"
3. "A Look into the Future,"
4. "Research Priorities,"
5. "Research Dissemination Functions," and the
6. "Use of Research Funds."

It seems appropriate then that we begin another series of presentations by taking a look at getting recent research into action:

1. What is it that needs doing,
2. Who should do it, and
3. How could it be accomplished?

This presentation provides me with an opportunity to express some of my personal opinions and observations about these questions. I welcome this opportunity since it represents my internal struggles over the past year as a director of a RCU, and also as teacher educator in agriculture. You will find my discourse less than academic and not carefully documented, but rather (hopefully) a logical analysis of some alternatives for research administration for agricultural education.

My remarks will be directed to the broad problem of organizing efforts for implementing change in agricultural education. However, the problem and activities under discussion are not different from the ones central to other fields of vocational education.

I will devote most of the time allotted to me to a discussion of RCU activities. However, in my opinion, it will be fruitless to discuss specific RCU activities unless we first address ourselves to one of the most important elements for implementing change; namely, a structure for research administration.

Structure for Research Administration

The Nature or Research

Six years ago when I began my doctoral study, I would have defined research as "finding out for the 1000th time what everybody already knows and putting it in a language that nobody understands." Today, my thesis regard research is that somehow, somewhere, sometime, research should affect the student and the quality of the instructional programs offered. I will grant that this is not a definition of research, but if we as supervisors, teacher educators, and researchers are interested in research utilization our definition should at least, in part, encompass the stated thesis.

Research is not confined to university campuses. Nothing is easier to start than a debate on the issue of where should a RCU be located, or on the issue of pure versus applied research in vocational education. The availability of resources for research is the most important consideration. Research must be objective. Objectivity is not a property of the data gathered but of the researcher's or consumer's attitude toward the data.

There is a definite need for the development of an intercommunication network for research and development activity in agricultural education. Research must also be ongoing. Static thought is knowing where theories were derived; constructive thought is the linking of those theories together. Research and development is starting where the theories were derived and going on from there.

The basis for such a network could and probably should be a schema for research and development functions. Research in vocational education, agriculture included, has had a history of low production because it has not been complimented by any significant attention to development and diffusion. We must all work together to establish and maintain appropriate distinctions between the functions of research development and dissemination. This togetherness does not mean that everyone should, could, or will do everything in the research and development sequence.

Brickell in a discussion of the role of research and development in vocational education made the following generalizations about the research and development sequence as one moves from basic research through development, field testing to diffusion:

*One man working alone can accomplish less and less
*More and more people must be dealt with
*Cost rises sharply
*The value of a dollar diminishes
*The amount of hardware and material needed goes up
*The average level of human talent goes down
*Sharpness of thinking diminishes
*Quality of ideas tend to be diluted
*Ideas must be pushed rather than pulled
*Facts unaided by emotions become less persuasive
*Emotion unenlightened by facts becomes more persuasive
*Strategies of educational change must deal less with men and more with institutions

Dr. Brinkell states that he cannot guarantee the accuracy of his generalization, but I must confess that they fit my experience with research and development activities.

Research Coordination between Administrative Units

When we speak of research coordination, we ask what, how, and who must do it? I have already alluded to the fact that there is something for everyone to do--the basic researcher, teacher educator, the supervisor, and the RCU staff member. The problem is the establishment of communication among all participants to insure a wholesome coordinated team effort.

It is my belief that if we are to have a coordinated team effort, and if RCU's are to make a significant contribution to agricultural education the following structural conditions should prevail:

1. RCU's should be staffed with researchers who have had some experience in vocational education at several levels.
2. There should, if possible, be representation of all vocational services on a RCU staff either on a part-time or full-time basis.
3. There should be a designated coordinator of research on the teacher education staff in agriculture.
4. If the state RCU is located at a university, there is a need for a research specialist on the state agricultural supervisory staff.

Now, I am sure there will be more than one RCU director who will disagree with my suggested structure. My views on RCU administration are based on my experience in only one state. Let me hasten to say that I am not speaking of administrative atmosphere but of the atmosphere toward the implementation of research findings.

Administratively there may be some differences but from the standpoint of research utilization I doubt if there is a dime's worth of difference.

For the past fifteen months I have been struggling with problems of trying to identify a role for a RCU. Newsletters, position papers, writing proposals, research reviews and literature searches should not be the primary tasks of RCU's. In my opinion these are "push" type activities. If RCU's are going to make a significant contribution, it will be necessary for them to come up with some "pull" activities. Someway, somehow RCU's must:

1. Make a concerted effort to assist each vocational service in solving their operating problems.
2. Make an effort to bring together accumulated research into an organized package which can be used in creating new and improved existing programs, and
3. Assist in assessment of the effectiveness of proposed solutions and programs.

These, in my opinion, are the major tasks of a RCU. Hence, these are the reasons for my suggested structure for research administration.

Now for a discussion of some more specific activities for implementing change in agricultural education. I will group these activities under five areas: (1) research and development needs, (2) diffusion of research information, (3) in-house research activities, (4) development of research and program development competencies, and (5) field activities.

Activities for Implementing Change

Research and Development Needs

1. Development of research and development priorities for agricultural education by utilizing the activity analysis approach.
2. Conduct comprehensive studies for vocational-technical education for local systems.

3. Assist those responsible for administering agricultural education programs in organizing and using research and development committees in agricultural education.

Diffusion of Research Information

1. Research Highlights in Occupational Education.
2. Synthesis of Recent Research in Agricultural Education.
3. Summaries of Research Studies in Agricultural Education.

In-house Research Activities

1. Development of a Verbal Model for Systematizing and Augmenting Data for Program Planning and Development in Agricultural Education.
2. Development of an Activity Analysis Approach for Planning County and Multi-County Programs in Agricultural Education.

Research and Program Development Competencies

1. Institute-Workshop for Planning Developmental and Related Programs.
2. Research and Program Development Seminars.
3. Leadership Development Conferences.
4. Institute-Workshop for Planning Programs for Specific Needs.

Field Activities

1. Pilot Programs for the Development of the Inter-Disciplinary Approach to Career Development through a High School Program of Occupational Education.
2. Pilot Programs for the Development of a Vocational and Compensatory Education Curriculum for the Rehabilitation of Socially and Economically Deprived Youth.
3. Pilot Programs to Assist Youth to Make the Transition from School to Employment.

In conclusion, some peole seem to question whether or not RCU's can be of assistance in implementing change in agricultural education, or if they are going to be or should be involved at all. I feel RCU's should and will be involved. The question is whether or not RCU's are going to do it well.

TEACHER EDUCATORS-SUPERVISORS: COOPERATION FOR CHANGE

Francis Tuttle, Director
Vocational-Technical Education

Here are some of the facts which make our lives different from any previous era: the knowledge explosion, space, radical social change, secularization, emerging nations, the population explosion, urbanization, specialized and mechanized farming. Along with these, we also have cybernetics, the new ethics, telstar, the computer, atomic warfare, and the United Nations. To enumerate even a few characteristics of the present age is to recognize its complexity. It has been said that the tempo of change is itself changing so fast as to leave us without standards by which to measure it. In the midst of such change we as teacher educators, vocational supervisors, researchers, curriculum specialists, and administrators find ourselves more or less in a state of shock. If not shocked, we are at least unsure of ourselves. Because of the new technology's super mechanization, labor shortages, specialization, and market fluctuations---we all know there are implications for change.

New curriculums, new requirements for teacher education, new instructional materials, new programs of research are all indicated. The problems in education are further complicated by the fact that in recent years educators, in general, have stubbornly ignored the contributions of those disciplines that relate to the daily needs of boys and girls. The educator holds the key position to disseminate knowledge both in kind and amount. Undoubtedly it was the dilemma of the "kind and amount" of education that prompted C. P. Snow to present his epic lecture in 1963 on the two cultures---exemplified by humanists and the physical scientists. To Snow, the humanist at one pole and the physical scientist at the other, represented the extremes to which education has gone in our modern society. Snow developed the thesis that the dichotomy has grown so great that these two groups are working at what seems to be cross purposes which is dangerous, perhaps fatal, for civilization.

It is not a mere dilemma of how to educate, but what to educate for. It is more of a dilemma of the means by which public education can meet the needs not only of "all boys and girls" but also of all the people so as to assure them a productive yet rewarding part in our present day society. It is the "whole" individual of Dewey and the "education for life" of Prosser that concerns Snow and others like him. Precisely stated, the problem is to make education relevant to the needs of boys and girls. And, by chance, if one should think this is not the problem, the test is obvious---just ask youth itself.

To develop the point still further, society needs to be reminded that there is more than one means to an education. The classical notion, that college is the pinnacle of attainment for all, overshadows the efforts being made to provide for those who neither aspire to, nor can achieve it at the collegiate level. John Gardner, former Secretary of H. E. W., made the widely publicized statement that:

> An excellent plumber is infinitely more admirable than an incompetent philosopher. The society which scorns excellence in

plumbing because plumbing is a humble activity and tolerated shoddiness in philosophy because it is an exalted activity, will have neither good plumbing nor good philosophy.

Education then, can well become relevant to youth who seek status through excellence in plumbing. When educators recognize this and communicate the needs of education to both plumbers and future philosophers they will earn the right to stand between both cultures.

It is my observation that agricultural education has been elevated on the status symbol ladder to the point where it is not totally indecent to study or teach agriculture or to farm. In fact, it is a status symbol among professionals to own and operate a farm.

The specific question today is what is the role of vocational and technical education in meeting the needs of boys and girls?

How do we determine what to teach? Who determines what is taught? How do we teach it? Is it relevant? Do we teach the same curriculum in all schools? What levels do we teach? What about the curriculums in different administrative structures? Vocational high schools, shared-time vocational high school centers, post high school vocational schools, community college curriculums, direct training for industry, and hundreds of other factors become a necessary part of the decision making processes.

No one group or category should determine answers to these questions. The agriculture supervisor, the agriculture education teacher educator, the local teacher, farmers, and agriculture related industry must all be a part of the process.

Research Coordinating Units can play a big role in making these determinations in providing research, statistics, data, and information to the decision makers. Generally, we are not supporting these units to the fullest extent. The teacher, the supervisor, and the administrator must make much greater effort to relate the problems, develop a thesis and call for help. The teacher educator and the researcher must then take the ball. Teachers and supervisors are generally not research minded. They are too busy with day-to-day problems to think in these terms. Teacher educators many times are not where the problems develop so they are not aware of them. We better get together. The teachers and supervisors must take some time to communicate the problems. The teacher education department staff must schedule some time to pump, probe, question, needle, and experience the problems. Both groups need to communicate with farmers and industry.

State Department staff meetings should be open to teacher educators---not only open to them---they should be invited---and they should attend.

R. C. U.'s are the greatest development of recent times. Their potential has not even begun to be realized. Current national legislation should provide greater support. Universities and State Departments should support them with their dollars.

Vocational agriculture has changed, but it must change more. It must be more flexible. It must not be afraid to accept new responsibility or give up some if change dictates it.

Vocational agriculture must accept the responsibility in many small schools that the teacher is the only counselor available that ever had his hands dirty; the only counselor that knows the joys and problems of the working man; the only person in the school system, in many instances, who is really interested or understands the needs of that school's boys. They must accept this responsibility to a greater extent. Teacher education must provide additional training to help them do the job. They must recognize it as a function of the teacher.

Vocational agriculture teachers do more toward the development of the "whole" individual than all the other departments in our schools. They teach speech to those who can profit by it, but they don't force it on every student. They teach leadership but they recognize some will never be leaders and provide other experiences for those. They correlate and integrate math and science into their teaching when it is relevant. They must be willing to go further---especially in small schools---and develop cooperative work-study programs for certain students.

Specialization may be indicated in larger schools and Area Vocational High Schools. Much more study and research should be developed in these areas.

In closing---stop worrying about being legislated out of business--just worry about how to take care of the new emerging responsibilities. Vocational agriculture has been of age for some time. I expect it to continue to vote for many years to come.

CHANGING TEACHER BEHAVIOR - CLIMATE FOR CHANGE

Charles Webber, Superintendent of Schools
Guthrie, Oklahoma

Introduction

Perhaps the place to begin this presentation is with a brief description of the Guthrie community.

The Community

Geographically - Guthrie is located in North Central Oklahoma, 25 miles north of Oklahoma City on Interstate 35. Guthrie serves a predominately agriculture region. The city proper covers an area of 10 square miles and is divided into east and west Guthrie by Cottonwood Creek. All major business establishments are located in East Guthrie.

Politically - Guthrie is the County Seat of Logan County, and from 1889 to 1910 was the Capitol City of Oklahoma. The Guthrie school district contains 187 square miles and its transportation area covers 277 square miles.

People - The population of the Guthrie community is composed of 25 per cent Negro and 75 per cent Caucasian. The average educational level is 9.0 years; and, the median family income is $2450.00. Guthrie residents are considered to be conservative in their politics and southern-traditional in their social patterns.

Industry - The industry in Guthrie consists of a furniture manufacturing plant that employs 250 people and a wholesale greenhouse facility that employs 150 people. Approximately 500 persons commute daily to the Oklahoma City Area to jobs at Tinker Air Force Base, Will Rogers Airport, and others.

Schools

Guthrie has five elementary schools, one junior high school, and one senior high school, with a total enrollment of 2780 in grades 1 through 12. Six-hundred and eighty-three of these children come from families with an income below $2,000.00 per year.

Our teaching staff in 1967-68 was composed of 108 classroom teachers, 2 counselors, 3 librarians, 8 principals, 1 speech therapist, 1 Director of Instruction and 1 Superintendent. Sixty-seven teachers have 20 or more years of experience and only 22 of the 108 have a Master's Degree.

Board of Education

Guthrie elects a seven member school board. Each member serves for six years and all are elected at-large. The present Board of Education consists of one M.D., one Doctor of Veterinary Medicine, one electrician, one banker, one abstractor, one shoe store owner, and one pharmacist.

Promoting Change

Board Philosophy

We believe the primary responsibility of the schools is to teach the basic educational skills to every boy and girl to the extent of their intellectual capacity, and in so doing provide them with the tools necessary to live in tomorrow's world.

Public education is the responsibility of the state, and as officers of the state it is the duty of the Board of Education to provide facilities, staff, and a curriculum capable of meeting the needs of every boy and girl.

The Function of Education

Frymier in his book entitled The Nature of Education lists three functions of education that seem especially important today: discovering information, sharing information, and affecting behavioral change, and I would add a fourth for the sake of teachers: protection from reprisal.

a. Teachers can be led to discover new information through committees, in-service programs, professional meetings, workshops, and summer schools.

b. Sharing of information is best accomplished through small group seminar and the normal power structure.

c. A behavorial change will be affected when there is complete confidence in the administrator's intent and when the teacher feels secure in their knowledge base.

d. The superintendent is the only individual that can assure members of the professional staff freedom from Board of Education reprisal. If he cannot assure this, the other effort will be in vain.

Now I believe this whole-heartedly, I believe it so much that I think the superintendency is a year to year job. Superintendents should not expect tenure. I always do a few signs and mumble a little prayer every time I make such rash statements. So far I have been able to move when I got ready to move, but I am sure that the old troll is going to get me sooner or later. But I think if the superintendent cannot assure his teachers that they will be free, not only from reprisal from the Board of Education, but also from his office, there will be very little change taking place in that classroom. Any superintendent that thinks he controls what goes on in the classroom either hadn't been there recently or is just real naive.

Now I think I can illustrate these comments by enumerating some barriers to change. Carlson suggests three main barriers to change in the public school. First of all, the absence of a change agent. Agriculture for years and years, has had a change agent; the county extension agent was a change agent. The vocational teachers are change agents. They have been backed by research from the agricultural departments. But in the public schools there has not been a change agent, at least one that was free from pressure and reprisal. This has changed today, we have a change agent for the public school.

The second barrier is a weak knowledge base. There has always been a lot of research in agriculture. There has been a great amount of knowledge available to every farmer who was interested enough to write his county extension agent or go in and see his vocational agriculture instructor. The third factor mentioned by Carlson is the domestication of public schools. The superintendent must be the change agent. He is the only one that can do it, the only one. The teachers can prod him, but the superintendent is the only one that can actually provide the impetus for change. We achieve a knowledge base in education by many of those things previously mentioned: through consultants, work shops, summer school, leave of absence, and the RCU's. So we cannot hide behind this idea that the knowledge is not available for us.

I am not necessarily in agreement with Dr. Carlson on the fact that the captive clientale of the school is particularly damaging to change. I find that parents and students are always more eager to change than our teachers provided they understand the change.

I would like to enumerate just briefly some of the things that we have done at Guthrie. I may not be the Superintendent at Guthrie at this time next year. You never know, but I think that there are some things that are inevitable. For instance, in our elementary schools, we have been able to go to a nongraded primary program that we feel is filling our need very much. We have developed a platoon system for our immediate grades that has allowed us to provide full time music and physical education program for our elementary schools without hiring additional teaching staff. We have developed a central library system that I take no credit for whatsoever. I think that our elementary school librarian has done a tremendous job. The parents and the students have accepted this program with a tremendous amount of enthusiasm.

Some of our innovations at the elementary level include the following: we hold an outdoor science program for our sixth grade where we take them out to recreational areas for a two weeks program. They actually work in the field of the county agent, the local game warden, the state highway patrol, the marine biologist, etc. We have about fifteen consultants that are very knowledgeable in their particular field who participate in this. We use teaching machines in our primary programs. One thing that will motivate them quicker than any thing we have found is a nice little gadget. They will learn in spite of themselves.

At the secondary level, we have gone into such things as team teaching for our language arts program, our special eduction program, and our vocational education program. We are developing an independent study program for those students in our senior high school who prove they are capable of handling this sort of thing.

I will summarize my remarks by saying that the make up of the community is not a hindrance to change. It simply dictates the procedure and the method one must use to adapt. Change for change sake is not desirable. If this is the only reason we have for making the change then we should stop and think a bit. But when 20% of the elementary children are at least one grade level below their reading norm, we think action is called for. We read that from 1958 to 1963 American farms produced the highest level in the world's history. They did this while eliminating one million farm laborers. I think this demands action in our vocational program. When we also read that industry during the same period of time hit an all time high in industrial growth and development and at the same time eliminated 500,000 jobs from the work force, I believe it requires action. The climate must be right before change will occur. In the public school, the superintendent determines the climate.

VOCATIONAL AGRICULTURE OF GUTHRIE HIGH SCHOOL

Tom Carey, Teacher of Agriculture

Absorption of vocational education into the public education curriculum was a natural product of the American goal of education for all the children of all the people.

Equality of opportunity in our present system of education is not afforded to the mass of our children. While our schools are open freely to every child their aims and purposes are such that a majority of the children are unable to take advantage of them beyond a certain grade and hence do not secure at public expense a preparation for their work in life. Although here and there we see the beginning of change, it is still true that the schools are largely planned for the few who prepare for college rather than for the large number who go into industry. A national survey shows that eighty percent of our high school graduates will not obtain a college degree. But they will need some kind of employment.

The controlling purposes of vocational education programs at the high school level is to develop skills for useful employment. These programs relate school work to a specific occupational goal but involves more than training for specific job skills.

Vocational education is not offered in lieu of general academic education but grows out of it, supplementing and enhancing it. Vocational education is an integral part of the total education program and requires aptitude that students at the lowest academic level do not have. Slow readers, for example, are not able to benefit from regular vocational programs.

Since all education today is, and must be, both liberal and vocational, the task is not that of finding the appropriate proportion of each but rather of re-appraising and re-defining all courses so that they contribute to both. We have in fact, begun to do this; we have only failed to realize and commit ourselves whole-heartedly to the process.

It must be recognized that a student's gifts may lie in areas other than the academic. Artistic and creative talent must also involve the cooperation of parents, for parental attitudes strongly influence all schools.

The Guthrie School Administration feels that a strong program of vocational education can serve several important purposes. Opportunities to learn job skills are relatively easy for the pupil to value. They can increase his interest in school. They can help him to consider himself a useful and respected person. They can develop the initiative and sense of responsibility that are basic to preparation for college as well as for new jobs. And they can be designed to introduce or incorporate lessons in science, economics, or other subjects.

Programs of part-time work and part-time study are advisable for many children who are likely to benefit little from an almost exclusively classroom-oriented education. Such programs hold out the hope that many pupils whose handicaps the schools have not otherwise been able to overcome will become contributing, self-supporting adults. The planning of work-study programs demands considerable flexibility and close contact between school and community.

The fact remains that the economy has less and less need for the poorly educated. As the technology becomes more complex, it becomes harder to help the poorly educated to develop marketable skills. When the society fails to develop America's potentials, it limits chances for productive employment to a disappearing segment of the economy. A public works program can merely compensate for the failures of a society; it cannot correct them. The long-range solution is an increase in the length and effectiveness of schooling.

A platform for vocational education in the future will be constructed upon the strength of renewed commitments to the American ideal of education for all. Vocational education must figure prominently in the attainment of this goal. The end product is not solely the responsibility of the vocational educator. Successful vocational education programs, to contribute maximally to the social and economic stability of the nation, must evolve from many relevant sources.

Three years ago, the Guthrie Vocational Agriculture Department was a one teacher department, teaching only Production Agriculture with approximately thirty students enrolled. With the declining enrollment and fewer and fewer farm students available, the School Board, Vocational Agriculture instructor, and administration felt that a revamping of the program was needed.

Within the last three years this department, with technical and financial help from the State Department of Vocational-Technical Education, has grown to be the largest in Oklahoma in the number of students, the number of teachers and the size of its "physical" plant. We have one hundred eighty students enrolled for next year which is the maximum number of a three teacher department with fifty more on the waiting list. With eighty-five percent of our enrollment being town students we have striven to set up a program to help prepare them for their work in life, and develop skills for useful employment.

Our present curriculum of study consists of Production Agriculture, Agriculture Mechanics and Horticulture. We use a team teaching method of instruction. We rotate our Freshman and Sophomore students each nine weeks from one instructor to another. This way they will be given instruction in Production Agriculture, Agriculture Mechanics and Horticulture by an instructor who is more or less specializing in one of the above mentioned courses.

By the time the students are Juniors we feel that they have made up their minds which of the fields they would like to concentrate their efforts on for the next two years. So we offer a two hour course in advanced Agriculture Mechanics, Horticulture Occupations, and Production Agriculture III and IV.

We feel that students in Production Agriculture need some Agriculture Mechanics both Junior and Senior years and that Agriculture Mechanics students need some Production Agriculture which also included leadership training and public speaking. We rotate the Juniors and Seniors one nine weeks between Production Agriculture and Agriture Mechanics.

The girls that are enrolled in Vocational Agriculture take only Horticulture and do not rotate.

The following is a course of study that is being offered by each division of our department.

PRODUCTION AGRICULTURE SECTION
INSTRUCTOR - Mr. Tom Carey

UNITS TAUGHT

Production Agriculture I

(1) Orientation
(2) Future Farmers of America
(3) Supervised Practice and Work Experience in Agriculture
(4) Animal Nutrition
(5) Breeding and Improving Herds and Flocks
(6) Animal Selection
(7) Public Speaking
(8) Judging Teams
(9) Agriculture Definitions

Production Agriculture II

(1) Future Farmers of America
(2) Supervised Practices and Work Experience in Agriculture
(3) Care of Young Animals at Birth
(4) Soil Management
(5) Plant and Seed Identification
(6) Selecting Varieties of Crops
(7) Selecting and Using Cultural Practice with Crops
(8) Harvesting Crops
(9) Public Speaking
(10) Judging Teams

Production Agriculture III

(1) Future Farmers of America
(2) Supervised Practices and Work Experience in Agriculture
(3) Controlling Parasites of Livestock and Poultry
(4) Controlling Diseases of Livestock and Poultry
(5) Controlling Parasites of Plants
(6) Controlling Plant Diseases
(7) Production of Vegetables
(8) Landscaping the Home Grounds
(9) Public Speaking
(10) Judging Teams
(11) Beef and Swine Production
(12) Crop Production

Production Agriculture IV

(1) Future Farmers of America
(2) Supervised Practices and Work Experience in Agriculture
(3) Marketing Livestock
(4) Marketing Animal Products
(5) Marketing Crops
(6) Becoming Established in Farming
(7) Securing Money to Finance Agricultural Occupations
(8) Keeping Farm Records and Accounts
(9) Selecting Equipment for Farming
(10) Analyzing Production for Farming and Ranching
(11) Planning Total Farming Programs
(12) Public Speaking
(13) Judging Teams
(14) Beef and Swine Production
(15) Crop Production

HORTICULTURE OCCUPATIONS
INSTRUCTOR - Mr. Tom Carey

UNITS TAUGHT

(1) Retailing Opportunity
(2) Qualities of the Successful Retailer
(3) Human-Relations
(4) Learning Store Policies and Store System
(5) Reading Merchandise for Sale
(6) Knowing Your Merchandise
(7) Basic Requirements for Successful Selling
(8) Moving Up the Sales Ladder
(9) Becoming a Consumer Consultant
(10) Visual Merchandising
(11) Sales Promotion
(12) Customer Services
(13) The Changing American Market
(14) Effective Store Layout
(15) Buying to Meet Customer Demand
(16) Greenhouse Management
(17) Flower Production
(18) Vegetable Production
(19) Supervision on Job-Training

AGRICULTURE MECHANICS SECTION
INSTRUCTOR - Mr. Richard Carter

UNITS TAUGHT

Vocational Agriculture I	Hours
Introduction and Orientation	1
General Shop Safety	2
Tool Identification	3
Differential Leveling	10
Laying Out 90° Angles	4
Introduction to Arc Welding	15
Introduction to Oxy-Acetylene Cutting	10
	45

The section of students who have an additional nine weeks of Agriculture Mechanics also have the following:

1. Arc Welding
2. Small Group Instruction on Contest Materials
    a. Farm Shop
    b. Farm Structures
    c. Electrification
    d. Farm Level

Vocational Agriculture II	Hours
Introduction and Orientation	1
General Shop Safety	2
Hand and Power Hacksaw Operation	1
Drill Press Operation	1
Pipe Cutting and Threading	2
Use of Angle Iron Bender, Notcher, and Shear	1
Hossfield Bender (eye bolts and U-bolts)	5
Introduction to Oxy-Acetylene Welding	20
Stationary and Portable Grinders	2
Arc Welding (Pad Preparation)	10
	45

The section of students who have an additional nine weeks of Agriculture Mechanics also have the following:

1. Minor Project Construction
2. Small Group Instruction - Contest Materials
    a. Farm Shop
    b. Farm Structures
    c. Electricity
    d. Farm Level

Advanced Agricultural Mechanics - 2 Hour Program

	Weeks	Hours
Concrete and Masonry	3	30
Advanced Arc Welding	3	30
Advanced Oxy-Acetylene Welding and Cutting	3	30
Inert Gas Welding (T/G & M/G)	3	30
Small Gasoline Engines	5	50
Tractor Maintenance and Repair	4	40
Tool Fitting	1	10
Plumbing	2	20
Electricity	4	40
Painting	1	10
Building Construction	2	20
Project Construction	4	40
Soldering and Sheet Metal	1	10
	36	360

INSTRUCTOR - Mr. Darrell Duff

UNIT TAUGHT

Agricultural Mechanics I

A. Tool Identification
B. Plumbing
C. Soldering
D. Sheet Metal Work
E. Tool Conditioning
F. Arc Welding
G. Acetylene Welding
H. Project Construction

Horticulture I

A. Plant Identification
B. Horticultural Definitions
C. Reproduction of Plants
D. The Floriculture Industry
E. Structures for Growing Plants
F. Soils, Fertilizers, and Irrigation
G. Cut Flower Crops
H. Pot Plants
I. Pest and Diseases of Flower Crops
J. Garden Planning
K. Garden Crops
L. Practical Exercises in Flower Arranging, etc.

Horticulture II

A. Status and Development of the Nursery Industry
B. Greenhouses and Related Structures
C. Greenhouses and Related Structures
D. Environmental Factors Influencing Plant Growth
E. Greenhouse Soils
F. Gravel Culture
G. Fertilizers
H. Advanced Plant Breeding
I. Diagnosing Plant Disorders
J. Greenhouse Production of Cut Flower Crops
K. Greenhouse Production of Potted Flower Crops
L. Foliage Plants, Cacti, and Succulents
M. Bedding Plants
N. Marketing of Greenhouse Crops
O. Landscape

Extra responsibilities require a great deal of time aside from our regular classroom teaching. The department conducts thirty adult and young farmer classes each year. Also, each instructor is designated certain responsibilities. I have listed these along with our class schedule.

GUTHRIE 1968-1969

CAREY	EXTRA RESPONSIBILITIES
8:30- 9:30 - Prod. Ag. I	(1) Dept. Head
9:30-10:30 - Prod. Ag. II	(2) F.F.A. Advisor
10:30-11:30 - Prod. Ag. III	(3) Public Speaking
11:30-12:30 - Prod. Ag. IV	(4) Crop Judging
1:30- 2:30 - Hort. Occup. Boys & Girls	(5) Hort. Judging
2:30- 3:30 - Hort. Occup. Boys & Girls	(6) Livestock Judging
	(7) Dairy Products Team
	(8) Oversee Entire Supervised Farming Program
CARTER	
8:30- 9:30 - Ag. I Shop	(1) Supervised Swine & Crop Projects
9:30-10:30 - Ag. II Shop	(2) Farm Shop Team
10:30-11:30 - Ag. Mech. II	(3) Farm Level Team
11:30-12:30 - Ag. Mech. II	(4) Electricity Team
1:30- 2:30 - Field	(5) Structures Team
2:30- 3:30 - Field	(6) Farm Mgt. Team

DUFF

8:30- 9:30 - Hort. I (Boys)
9:30-10:30 - Hort. II (Boys & Girls)
10:30-11:30 - Hort. I (Girls)
11:30-12:30 - Conference or Field
1:30- 2:30 - Ag. Mech. I
2:30- 3:30 - Field

(1) Supervise Beef & Crop Projects
(2) Entomology Team
(3) Meats Team
(4) Chapter Meeting Team
(5) Land and Range Team
(6) Dairy Cattle Team
(7) Poultry Team

Vocational Agriculture has its accompanying organization, the Future Farmers of America.

The Future Farmers of America is a national organization of, by, and for the boys studying vocational agriculture in public secondary schools which operate under the provisions of the National Vocational Education Act. It is an educational, non-profit, non-political youth organization of voluntary membership designed to develop agriculture leadership, character, thrift, scholarship, co-operation, citizenship and patriotism. Members learn how to take part in meetings, to follow parlimentary procedure, to speak in public, and to cooperate with their fellow students in programs for individual and community betterment.

Agriculture is this nation's largest single industry. It is basic to our continued economic and social stability. The production, processing, and distribution of agriculture products employs more than a third of America's working force; and farmers are a $14 billion-a-year customer of industry and labor--not counting the billions farmers spend for consumer goods.

Our great cities, our mighty industries, our business and professional accomplishments, our educational institutions, and our high living standards are all possible because of the efficiency and of the productivity of the American farm.

Likewise, the agricultural interests and income of farmers are inseparably tied to the health and prosperity of working men and women and the industries in our towns and cities. No one element of our nation can scarcely exist, and certainly not prosper, independently of the others.

This nation must have a constant supply of new farmers, plus trained personnel in off-farm agriculture occupations. These must be men and women experienced and trained.

The number of young men on farms are more than adequate to meet the needs for replacement, but not enough of those who enter farming have the educational background that is necessary for success under modern conditions. Vocational Agriculture constitutes the most effective program yet developed for training boys and girls to be good farmers and good citizens, and helping them to become established in the agricultural occupations of their choice.

PRIORITIES FOR RESEARCH IN AGRICULTURAL EDUCATION
TASK FORCE REPORTS

CHAIRMAN: Charles I. Jones, North Carolina State University

Group I

1. What are the responsibilities of Agricultural Education for the economically deprived in rural areas? (retraining techniques)
2. Research on planning facilities for vocational education.
3. Research to help identify emerging jobs in Agriculture and the preparation needed for them.
4. Research on developing statewide curriculum.
5. More research on program evaluation - what to evaluate and how best to evaluate it - need to evaluate the effectiveness of various programs of occupational preparation.
6. More follow-up of rural youth - graduates and non-graduates - what jobs they have, where, etc.
7. Research to help us assess the characteristics of our student - subject matter - reading level.
8. Parental attitudes and expectations towards vocational programs.
9. Role in providing occupational education for youth across the board.
10. Developing programs for teaching in new areas.
11. Development of curriculum materials for the new areas, and better ones for the old areas. Programmed instruction, loop films, etc.
12. The role of guidance in vocational education.
13. The scope and responsibility of Vocational Agriculture in the area of adult education.
14. What are the new roles of the Agriculture teacher - how can he effectively work with the culturally and economically deprived student - what roles should be dropped or changed.
15. Research on the organization, administration, and operation of multiple teacher departments.

Group I (Continued)

16. Financing of vocational education.

17. Supervised practice or work experience - research on developing a model for supervised experience - conduct studies to see what variations exist between states.

18. Research on new programs for teacher education.

19. How to improve the image of Vocational Agriculture? How to change the image in the minds of the public (from one of production agriculture only to the broader aspect)?

20. Research on the vocational agriculture teachers' concept of his role. It is the same as the administrators, supervisors, and public concept.

Group II

CHAIRMAN: Robert H. White, Clemson University

1. Developing learning activity packages for various teaching areas in vocational agriculture.

2. Determine the efficiency of combining into one class students of extreme activities and handling them as one group.

3. What are some methods of improving instruction for adult farmer classes?

4. What are methods of assessing teacher effectiveness of efficiency?

5. Skill testing or performance testing of students versus achievement tests only.

6. What is the relationship between interest in agriculture and achievements in an agricultural occupation?

7. What employability skills should be taught in order for a person to remain employed after they have obtained the necessary employment skills?

8. How are employability skills taught?

9. What are the socio-economic characteristics of adults who need retraining and what are the job opportunities for which they may be trained?

10. What job opportunities are available in non-farm agricultural occupations in order to provide a basis for areas of specialization?

Group II (Continued)

11. Who should offer occupational training in off-farm agricultural occupations?

12. What is the place of the supervised farming program in the learning process in terms of kind, scope, and place in which conducted?

13. What emphasis should be placed upon part-time farming?

Group III

CHAIRMAN: Lewis Eggenberger, Texas Technological College

I. Changing attitudes.
   A. The identification of factors in Agricultural Education that would assist in changing students' attitudes.
   B. What is the role of Agricultural Education personnel in changing students' attitudes?

II. Identification of basic competency areas in agricultural occupations. (Example - Do we need to train a student to repair each farm implement?)

III. A. Identification of areas where team teaching would be effective.
   B. What are the factors that affect team teaching effort?

IV. Development of innovative approaches to retraining vocational agriculture teachers.

V. How do we attract more people into vocational teaching.

VI. The role of agriculture in the education of the disadvantaged.

VII. The educational level at which specific vocational training should be provided. Should a high school student be trained as a tractor mechanic.

CONFERENCE SUMMARY AND EVALUATION

Robert R. Price, Oklahoma State University

Very briefly I want to share with you a few things that we discussed at this conference. There were some things that challenged us a great deal:

1. The first day we were told that a system is not a guarantee of success. Sometimes we are called upon to change some of the system. A system that may have worked in one area may not be sufficient for another.
2. Teacher time is so valuable that we must direct more effort toward professional activities. I think this is quite true. For example, secretaries can keep records more accurately and completely than most staff members.
3. The norm should be generated by the system itself. This is something we sometimes forget. You see, we go outside the system and, after heeding our own biases we often apply them to situations inappropriately. Fox example, this may be happening as we "plan" programs for disadvantaged youth in ghettos.
4. An attitudinal change requires full commitment and involvement of all parties; that is if you, as an educator, are going to give yourself to the task of changing attitudes of people, it might be that you will have to be more completely involved yourself and, above all, be willing to change your own attitudes. It involves all parties. During this conference, we have had this brought out time and time again.

5. The "medium is the message" concept reveals a new source of power. This is something that is very striking today. We saw it this morning as we had our attention called very fortunately to a newspaper article about Vocational Agriculture at Guthrie, Oklahoma.
6. Perhaps we need a further blending of the technical know-how with skills and understanding, acquired through research, with the teaching-learning process. In our discussion period you heard some of our teachers indicate a need for more technical knowledge. Another one said, "Yes, but I still need to know how to put information across." Perhaps a blending is definitely needed here.
7. To freely function as a true educator among disadvantaged folk calls for full acceptance of the person as he is at this moment. I can't help reflect a little on the "spitting incident" because I think it was misunderstood. Dr. Thompson was telling us that you don't go to people on the first contact and tell them what they should and what they should not do, because immediately you raise a barrier. Discipline must come, but it effectively develops later. You see, it originates with the person, and this is what I think we are being told. It isn't that we would want to continue classes where we would be spit at every day. We just have to accept people as they are: above all as a worthy person; a person who is living. I think there is a whole new world opening for us as this concept begins to permeate our culture.

8. A great danger may lie in our tendency to consider change as permanent. Don't we do this all the time? Something new comes up and we give ourselves to it but once we get this done then that's it. Well, it probably isn't. We need to make additional changes. Professional researchers desperately need to listen to lay people, educators and other consumers of research. We heard that over and over again at this conference. It is very important. The researcher can become out-of-touch with the real problems of teachers. I think the following quote sums up what we have concluded at this conference. "Ideals without facts are empty and facts without ideals are blind."

We are glad for everyone who participated in this conference. We in Oklahoma have been enriched a great deal by the presence and the enthusiastic participation of all individuals.